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Air view of New Orleans, where the Seventy-Seventh Annual Session of the American Dental Association will be held, November 4-8.

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THE JOURNAL
of the AMERICAN DENTAL ASSOCIATION

Vol. 22 NOVEMBER, 1935 No. 11

Original Communications

MEDICAL AND DENTAL RELATIONS*

By B. B. McCOLLUM, D.D.S., Los Angeles, Calif.

THE PHYSICIAN

THE "medicine man" is as old as humanity. No tribe or race has been without him. He has played an all important rôle in every phase of man's existence. Starting with plain voodooism, man has always been concerned with means to cure his ills. Quacks, fakirs, wizards and unscrupulous denizens of every sort have plied their trades, based on man's desire to enjoy health and protect himself from unfortunate circumstances.

Medicine as we know it today dates back a comparatively few years only. It is within the memory of living men that the empiric administration of drugs and the "horse sense" application of expedient measures dominated the practice of medicine. Science and logic have forced such an understanding of biologic facts that, within the last few decades, there have been going on rapid and in some instances revolutionary changes in the theory and practice of the healing arts.

During its evolution, medicine long retained its taint of witchery, superstition and the prejudices of false observation or lack of observation. Under the influence of science, witchery and superstition were the first to go, but many of the marks of prejudice still remain. Fads and fancies still prevail, and the glaring examples of medicine's shortcomings need no enumeration.

Many worthy ideas and practices have knocked at the door of medical intelligence, to find it locked and bolted. Admittance has been gained only by the persistent and repeated efforts of thinking men and women. So often, these efforts have been pitifully unappreciated. The individual, and, in some instances, the mass, nobility of the members of the medical profession is unexcelled in the

*Read before the Section on Medical Relations at the Seventy-First Annual Midwinter Clinic of the Chicago Dental Society, Feb. 19, 1935.

history of mankind. But medicine's nobility consists largely of its martyrs.

THE DENTIST

Dentistry knocked at the door of medicine about a hundred years ago and found the door locked and bolted. It is true that dentistry was advocated and practiced in the main by poorly educated and often unscrupulous persons, but so was medicine. Dental intelligence appealed to medical intelligence to be made a definite specialty of the medical schools, but it was rebuffed and compelled or allowed to form a separate profession.

Whether it was a good and necessary arrangement to have dentistry set up as a separate institution is a debatable subject, and much might be said for either side. From the standpoint of the particular problems involved in the teaching and training of operators to administer dental remedies, there are good reasons for the present arrangement. But there is no logic nor intelligence in the fact that the lines of thought of the two professions do not run parallel on all questions of biologic comprehension.

In practice, the biotic usefulness of the teeth was and still is completely overlooked, or should I say ignored, by medicine. No consideration is given the functions of the mouth in the process of digestion. The function of mastication is treated as of no consequence or importance whatever. In this connection, dentistry is found equally at fault, as will be discussed later.

DEFINITIONS

In order to discuss the relation of medicine and dentistry in a comprehensive way and make it easier to convey the thoughts herein presented, it is necessary to define some terms and phrases.

Dentistry is the art of maintaining the highest physiologic oral condition in human beings by using all available scientific processes. This interpretation is not a dictionary definition of dentistry, but do you not agree with me that it should be? This definition would dedicate dentistry to the task of maintaining the function of the mouth, and all dental effort would be primarily for the purpose of eradicating the pathologic processes affecting mastication.

Mastication is defined in the dictionary as chewing. But chewing is no simple act of mashing food. It is a complex physiologic process performed by a complex mechanism. This mechanism does not depend on brute force, but on an intricate physiologic coordination and cooperation of eight major muscles and two score minor ones that operate the mandible, the tongue, the cheeks and the lips in the various phases of mastication. The mandible is a single bone operated on two of the most complicated joints in the body.

The formation of the bolus takes place in a definite manner, it being wonderfully fashioned and controlled by the tongue, cheeks and lips. The cutting of the food in the normal relationship of the dental cusps and ridges is accomplished efficiently and without undue stress or strain on the teeth. The rolling between the teeth of the food to be comminuted follows a physiologic order. The salivary glands pour out their secretions in advantageous areas of the mouth. The mucin in the saliva produces a surface tension that holds the bolus together and assists in allowing the teeth to cut and recut the food into small particles. The teeth do not cut like knives, but by half cutting and half smashing, they husk the plant cells and expose their flavor to the tongue, and their contents to the action of the digestive ferments. An understanding of the physiologic functioning of the mouth cannot fail to excite the wonder and wholesome respect of any

physician or dentist for the masticatory apparatus; nor can it fail to create in anyone the highest esteem for good dental effort.

The term "masticatory pathology" first used in 1931 in a paper entitled "Masticatory Function," according to this paper, designates "The sum total of the morbid conditions, processes, and results which affect or interfere with the function of mastication, either diminishing it or destroying it entirely, or any condition or disease which causes or allows the masticatory apparatus in functioning to injure or destroy itself." The phrase "masticatory pathology," in a broad sense, deals with any or all of the general or specific morbid conditions, processes or results that are in any way potentially or directly concerned in the course of diseases affecting the masticatory apparatus.

A clinical entity is a group of morbid conditions, effects and symptoms that forms a more or less definite unit for consideration in the diagnosis and treatment of health disorders. As defined, masticatory pathology deals with a composite of many separate and distinct conditions or diseases, but all of them have one thing in common: they affect the function of mastication. For the purpose of this discussion, they are considered under one head, as a clinical entity.

It is the intention in this paper to discuss masticatory function in such a way that its significance and importance will be more clearly defined. The pathologic processes affecting it are grouped under the term "Masticatory Pathology as a Clinical Entity."

MASTICATION AND METABOLISM

It has been stated many times in nearly every textbook on physiology, both medical and dental, that the function of mastication is essential to good digestion. This dictum has seemingly been accepted in an unconcerned way at its face value by dentists, physicians and the laity almost everywhere; but, like Mark Twain's weather, about all that has been done is to talk about it.

One has but to turn to the literature of both the medical and the dental field to be convinced of the poverty of thought or understanding of the mouth as an organ playing an indispensable rôle, or, for that matter, any important part in the process of metabolism. Physicians, with few exceptions, look on the mouth only as a source of infection, and not from the standpoint of its function. Many have not hesitated to destroy, or have destroyed, the chief function of the mouth without a thought of the consequence to the patient's welfare: and this in spite of the fact that textbooks on physiology state that mastication is necessary to good digestion.

The teeth are considered mostly from the standpoint of looks, and there is an attitude held by many that mastication could be dispensed with, on account of our present methods of cooking and preparing foods. I have heard it so argued by physicians and many dentists, even in dental society meetings. Cases have been cited wherein people have lived to a ripe old age without having had teeth for many years. However, there is scarcely a vital or important process or function in the body about which the same thing might not be said. People hang on to life and exist for many years with the most serious handicaps and deficiencies in their life processes. One of my friends had had an aortic aneurism larger than his heart for more than twenty-five years. He died at the age of 87, and was quite able to be about up to the time of his death. He lived to a ripe old age, but would we say that such an aneurism

is not a serious thing, using him, or a hundred like him, as examples?

When we see the many and varied instances of the tenacity of life, we should be impressed with the possibilities of such a body without handicaps or deficiencies in any of the vital processes. The problem of health and life is answered only in how well we live, not in how long we exist.

In order to present the facts, as I see them, concerning the relation of dentistry to the health of the body, it seems necessary to speak frankly and bring to mind what to some may be irritating situations. I have no desire to offend, but I do keenly aspire to provoke thought and stimulate understanding regarding the possibilities of developing in dental education a more biologic comprehension of what is involved in the administration of dental remedies. I earnestly request your thoughtful consideration.

ORIGIN OF DENTISTRY AND SURGERY

Unfortunately, dentistry started as a cosmetic utility, and not as a health service. Teeth were removed to relieve pain. They were preserved or replaced to improve the appearance.

The barbers were the original dentists and surgeons. They offered relief from pain by pulling teeth; they removed foreign bodies, such as thorns and splinters from the flesh, and assisted by applying bandages and dressings to wounds, and they did the blood-letting for the physicians. Their service was very crude, but it pointed the way to the development of two large professional groups that now minister to the needs of man in nearly every community.

Notwithstanding its lowly origin, general surgery today occupies a position among the learned and respected endeavors. The science and art of surgery are a passport to a listing among the educated and renowned. In other words, a surgeon is a great man if he is a great surgeon.

It is not amiss at this time to analyze the advancement made by surgery, especially since it is indebted to dentistry for the discovery of anesthesia, both general and local, without which surgery as it is today could not be. The basic reason for the surgeon's position lies in the fact that surgery is connected directly with the life and health of the patient. No matter how remote the connection may be, surgery is always considered a health service. This association is the direct result of the system of education under which surgery has evolved. The surgeon's technic and the mechanics of his art are paramount factors in his work, but at no time has his education allowed them to overshadow the fundamental biologic sciences. His knowledge, judgment and skill are the result of an education and training paralleling that of the physician in the matter of health problems.

BIOLOGIC CONCEPT OF SURGERY

Surgery is defined as that branch of the healing art which deals with injuries, deformities and morbid conditions that need to be remedied by operation or use of appliances. General surgery is largely devoted to removing diseased parts from the body. In order to justify their efforts biologically, surgeons have gone to great lengths to demonstrate how and why the body can get along without some of its parts, such as the tonsils, gallbladder, appendix or one of any of the organs of which we have two, and so on throughout the body.

Right or wrong, surgeons insist, and physicians concede, that the only risk in an appendectomy, tonsillectomy, cystectomy, etc., is the hazard of the operation. The theory of evolution is invoked to prove that such structures are vestigial

remains of organs no longer necessary, and that the body can, and does, get along nicely without them. This attitude is necessary to uphold biologically a therapeutic procedure involving the removal of a part of the body for which no artificial compensation can be afforded. Perhaps the most enthusiastic surgical advocate would not insist on removing healthy vestigial organs; but such a radical attitude is closely approached in the surgical regard for the tonsils and the appendix.

We must bear in mind that surgical thought and procedures emanate from, and are a product of, the same school that produces the physician whose thought and procedure are based on a duty and a desire to keep and make the body whole. The apparent contradiction between the purposes of physicians and of surgeons is almost reconciled by their common health viewpoint. Surgery, in spite of its destructive operations, has nevertheless retained its fundamental connection with constructive health measures. Basically, the physician and the surgeon think in common terms. Whether you agree or disagree with the research efforts made by surgeons to defend and justify their operations biologically, you must admire their thorough and logical attempts at finding justification. The research and graduate work done in medicine is unexcelled in amount and diversification.

BREACH BETWEEN DENTISTS AND PHYSICIANS

An editorial in THE JOURNAL, 1928, page 2161, says, "Medical men do not think in dental terms any more than dental men think in medical terms." I fear that this is a true statement of the relations between the physician and the dentist. The editorial, which is about "Endowments to Dentistry," states further, "It is of course necessary for the two to cooperate in the closest way for the treatment of disease, and that physicians and dentists consult each other in the management of ailments affecting the teeth and jaws." If they think in different terms, why or how, should or could, they consult? Could not their minds through education be made to meet in a common understanding with a basic thought medium to both professions? There must be something missing in the present educational connection of the two professions which allows such an unforgivable breach to exist in the relations of medicine and dentistry.

The special requirements in the fabrication and administration of dental remedies probably amply justify the separate set-up of dentistry as an independent institution. There are sound reasons that dentistry has not been and could not be taught, as surgery is, in a medical school. But there certainly is no valid reason that the two professions should be separated by a lack of ability to communicate and think about the one thing which they should have in common—the health problem. There is no reason that dentistry should not have as keen an interest in a biologic background for the service that it performs as the surgeon or the physician.

Of course, medical men cannot think in terms of dental technic. But why should they? A technic is only a means to an end—a road to a destination. As long as the main aim and purpose of dentistry is, apparently, to develop and perfect a system and scheme of ingenious methods and devices, the medical men and the laity cannot be expected to understand dentistry as a health service.

The general surgeon is proud of the mechanical devices and the digital dexterity that are involved in his operations, but, at all times, it is the result of the operations, the effect on the life and

health of the patient, and not the technic involved, that counts.

Dentistry must find a way to insure a study of the physiology of the mouth that will relate its structures, functions and processes to the other parts of the body in true scientific fashion. When the biologic reason for administering dental remedies is established and biologically expressed, the cosmetic and technical aspects of dentistry will be relegated to the position that they should occupy, and medicine and dentistry will be on speaking and thinking terms.

DISEASES OF THE MOUTH

The more common diseases of the mouth manifest themselves mostly in or about the teeth. For that reason, too much attention has been focused on the individual tooth without due regard for the physiologic relation that the teeth bear to the mouth. The teeth are undoubtedly a most important part of the mouth. Without them, the mouth cannot perform its principal function—chewing. The teeth are really the *sine qua non* of the mouth.

THE TEETH

In order to discuss better the importance of the teeth, it might be well to draw a line of distinction between function and purpose. Function is defined as an act performed by a thing. Purpose is the use made of a thing. Therefore, let us say, the teeth have a purpose, not a function. The teeth do not function, the mouth functions with them. Mastication is the chief function of the mouth, and it uses the teeth for the purpose of performing that function.

The teeth are really a unit or battery of instruments or tools that the mouth uses to accomplish its part in the metabolic processes. Because the teeth occupy this relation to the mouth, they in purpose are to the mouth what the lens is to the eye. The eye cannot see without the lens, but the lens admits of substitution in whole or in part. Without teeth, the mouth cannot chew, but teeth can be substituted in whole or in part so that the mouth can be made to chew after the teeth are lost.

The relation of the teeth to the mouth, together with the ability of their structures to accept and benefit by the administration of substitutes for lost or for diseased tissues, is the condition that makes dentistry possible. The positive need of the mouth for a medium through which to perform its functions and the metabolic importance of this function well performed are the only conditions that make dentistry a possible health service.

Because the teeth can be replaced in whole or in part, the biotic significance of their purpose seems never to have been discovered. There seems to be no evidence that either dentistry or medicine has done anything by research or otherwise to establish the purpose of the teeth as vital or essential to the welfare of the body. As a consequence, dentistry has floundered around in its teaching methods and in the conduct of its practice, without a biologic foundation on which to build a health service.

Teeth can have but two purposes: chewing and enhancing the appearance of the individual. Looks are very important, but by no stretch of the imagination can the effort to preserve the looks of our patients be used to dignify the title doctor of dental surgery. Unless the teeth can be established as something more valuable than contributors to the good looks of the individual, there can be no definite health reason for preventing or regretting their loss.

ORAL PHYSIOLOGY AND PATHOLOGY

The future of medicine and dentistry

demands a better understanding of the true biologic significance of the tissues and functions of the mouth in health and disease. The oral organ is subject to a greater number and variety of diseases than any other part of the body. Yet its physiology and the importance of its function is almost completely neglected.

As a source of infection, the mouth is well known, we might say too well known. But it was medicine and not dentistry that discovered it as such. It is unbelievable that dentistry could give to the world that priceless gift anesthesia, and then fail so utterly to analyze and recognize the biologic expressions of the small part of the body on which it works.

Medicine has never looked on the special senses as anything but conveniences, and perhaps rightly so. Our sight, hearing, smell, taste and touch serve us only to select our environment and food to the best advantage; and they contribute to the joy, comfort and ease of living. The function of the organs of the special senses enter very little, if any, into the metabolic or health processes of the body.

The mouth harbors the sense of taste, but the real purpose and function of the mouth enters directly into life processes. The mouth is a part of the digestive tract, and, as such, is more than a hopper to receive and select the food that goes into the stomach.

Medical schools have a traditional aversion for the oral organ. This feeling, as far as we know, has always existed. It must have existed to a marked degree at the time of the organization of the first dental school. Medicine does not recognize the mouth as a part of its field, except as a source of infection, or as an index to diseases in other parts of the body. Medicine discerns no biologic necessity for the treatment of the mouth.

HUNTER'S MANIFESTO

When Hunter, after talking about it for twelve years, issued his famous manifesto in 1910 about American dentistry, which he bluntly called septic dentistry, he started a line of thought that divided the members of the medical and dental professions into three groups.

The first, probably most of them physicians, held the function of the mouth as of little or no consequence and found their disregard of mastication greatly stimulated. They felt, and, in many cases, said, "Why place a lot of restorations that cause all the damage pointed out by Hunter to replace something of no value anyway?"

Another group, probably most of them dentists, almost flew into a rage of high resentment. They censured Hunter, an Englishman, a physician, soundly for his temerity in venturing to criticize American dentistry.

The reaction from these two groups was twofold: The first caused a widespread wave of tooth extractions. After a little time to think it over, the resenting dentists issued a generalized condemnation of certain types of restorations. A gold shell crown, for instance, became a thing to shun just because it was a gold shell crown—not because it was badly fabricated. This and similar ideas spread to the public, and many gold shell crowns were removed to be replaced by other types of crowns as bad, or worse. Physicians then looked in the mouth and condemned teeth because of the type of restoration and not with any comprehension of the condition of the mouth. Little or no concern was given the integrity of the chewing function. The basic thought was elimination of infection.

THE DENTAL OUTLOOK OF TODAY

This therapy persists today. Patients

are "cured" of systemic ills by the extraction of teeth, with no thought of the functional welfare of the mouth. Its future health and metabolic usefulness are completely ignored. There seems to be no concept of the fact that when the mouth is crippled by the removal of some of the teeth, even one, its physiologic organic unity is destroyed, and it is doomed to deterioration. To treat one disease and cause another is not good therapy. The health concept and therapeutic procedures which have followed the observations concerning the mouth as a source of infective foci have contributed little to the advancement of dentistry, except to call attention as did Hunter to the awful possibilities and probabilities of "bad dentistry." The sacrifice of teeth on the altar of health has in no small way retarded the progress and confused the development of dentistry as a health service. The metabolic value of the teeth has been "cheapened" in the minds of both the patient and the doctor, whether dentist or physician.

The mouth has a mechanical action to perform in chewing the food, just as the heart has a mechanical action to perform in pumping the blood. Both organs demand a proper relation of their parts in order to fulfil their physiologic usefulness without degeneration. A third, very small group recognizes this physiologic concept of the mouth and acknowledges the truth of most of Hunter's statements. The members of this group see the systemic effects which he so dramatically presented, and they are deeply impressed by the seriousness of the conditions that he described, but they see the sick body from the standpoint of a failure in the care and physiologic concept of the mouth. They plainly recognize that the mouth, when neglected or maltreated, develops conditions that, in turn, react on other parts of the body. But, as their basic concern, they see the mouth as a functioning organ of the body, the preservation of whose integrity would benefit and protect the body.

With good masticatory function as the basis of dental therapy, every restoration or dental effort of any kind must have the health and welfare of the mouth as its primary purpose. The preservation, the restoration, and, in some cases, the creation of the chewing function carry with them a biologic concept that compels the elimination of all pathologic conditions affecting mastication.

DENTAL DISEASE AS A CLINICAL ENTITY

The pathologic conditions of the masticatory apparatus that commonly confront the dentist for consideration and treatment are malformation, malposition or absence of teeth, caries or wearing of the teeth, pulp and periapical lesions, infections and inflammations of the periodontium and, strange to say, badly fabricated and applied dental restorations. Many of these morbid conditions are separate and distinct diseases, and they may and do appear in almost countless combinations.

These variously combined conditions that the dentist is called on to treat have one element so positively in common that they deserve to receive attention as a clinical entity by physician and dentist, especially the physician who is not required to differentiate sharply between them. The common element of these morbid conditions is their effect, either directly or potentially, on the function of mastication.

Dentistry is faced with two vital problems: First, there is the desire on the part of physicians, and many dentists, to show that the teeth are not necessary to a "healthy" patient. This attitude is demonstrated by the statement of the "cure" of patients by extracting their teeth.

Most physicians, I believe, accept the idea that the patient is cured by extracting abscessed teeth. They do not differentiate between relief and cure. But why should they not believe the patient is cured? Dentistry has done no research to show the effects of having no teeth. The mouth is being studied, but, so far, workers have in effect ignored its function as a factor in the problem of metabolism.

The second problem is related to and is the outgrowth of the first. Caries is considered only as a symptom and not as a disease. The condition of the mouth is regarded as an index to the health of the rest of the body. To a certain extent, the condition of every organ in the body is an index to systemic disorders. The heart, the stomach, the liver, the kidneys, the lungs, all react to and are affected by diseases of which they are not the seat. If the heart is affected by disease in other parts of the body, the physician is surely concerned about the heart other than as an index. Why? Because he knows without a second thought the importance of the heart.

But what do we find in the case of the teeth? Physicians who make a specialty of metabolic and gland disorders are quick to use the teeth as an index to the metabolic or glandular conditions. But do we find them insisting that the highest oral function be maintained for their patients? I am afraid little or no attention is paid to the function of mastication. Observation shows that, even in metabolic clinics, the importance of the function of the mouth, chewing, is not only ignored, but also positively depreciated, if called to their attention.

It is well established that the presence of undeveloped, malformed, malposed or decayed teeth, together with certain inflammatory and infected conditions of the bones and soft tissues of the mouth, indicates serious derangement in the body mechanism. A dental biologic investigator has said, "Good teeth and good health go together." Quite true, but that statement was not made with any purpose of showing that the teeth contributed to good health. The basic concern of dentistry, and medicine, too, is the rôle the teeth play, not as indicators of, but as contributors to, good health.

Dentistry and medicine are equally at fault in their lack of mutual understanding of dental problems. The physician as overseer and keeper of our health has no moral or health right to neglect or ignore any part or function of the body. The dentist who has accepted the responsibility for the care and conditions of the mouth has no moral or health right to allow its function and biologic significance to be neglected. By biologic significance, I mean the rôle it plays in the processes of life—not its status as an index or as a focus of infection. In the metabolic research being done by workers everywhere, the mouth is ignored, except as an indicator. Its condition is considered only as a cause or a symptom of other diseases, and dentistry is allowing it to be so considered and ignored.

THE RESPONSIBILITY OF THE PHYSICIAN

The physiology and indications of health of the mouth should be as familiar to the physician, even though he does not treat its diseases, as the physiology and indications of health of the stomach, intestines, liver, pancreas, spleen, kidneys, heart, lungs and any other organ of the body. The purpose of the technical procedures in dentistry should be definitely appreciated by the medical man, even though he has not the slightest idea of how they are done. If he does not appreciate dental effort, and refuses to consider it, it is dentistry's duty to make him understand.

Most of the diseases of the mouth are slow and subtle in their progress. Many of them cannot be treated by the administration of pills or lotions, but require the direct application of remedies to replace diseased or missing tissue. These directly applied remedies for carious, worn or missing teeth are not recognized in our own books on dental therapeutics as remedies. The treatment for caries, the most prevalent human disease, is not accorded the consideration of a listing in the category of dental remedies. No wonder it is hard for the physician to understand.

DENTAL REMEDIES AND PHARMACY

Dental remedies, such as fillings, crowns and bridges, are difficult to produce and administer. This difficulty has overshadowed the purpose and nature of the remedies in many minds and has brought about much useless controversy regarding the relative merits of mechanical procedures to be used in producing remedies. In many ways, this has made dentistry appear more mechanical than remedial.

Pharmacy is an important branch of health service, but in no case has medicine allowed the pharmacy or fabrication of its remedies to overstep in any way its true relation to the physician.

Dentistry has not been so fortunate in this respect. Dentistry has been and, I believe, still is taught almost entirely from the standpoint of the pharmacy of its remedies. The "how to do" has transcended the "why and what to do." This is one condition that medicine, with all its own shortcomings, cannot tolerate or understand.

When dentists dignify in their own minds the application of a filling, in a tiny cavity in the tooth of a child, as the administration of a remedy to intercept the progress of a disease destroying or affecting unfavorably an important function, they will have taken the first step toward an understanding with physicians of their mutual problems. The biologic reason for the remedies of the physician and the remedies of the dentist is identical in every way, and both medical and dental schools, though compelled to differ in technical procedures, must predicate their education on that fact.

The physician is constantly dealing with diseases demanding prompt or emergency attention, which run their courses quickly from the acute stage in one of three ways: recovery, chronicity or death. The slow subtle progress of dental disease probably has no counterpart in any other part of the body. The dentist must visualize, for himself and the physician, the fact that the tiny cavity in the tooth of a child may mean chronic invalidism at 45 or 50. The ultimate effect of the mutilation of the mouth by the loss of teeth comes on so slowly that it may completely escape attention. It must be made plain to physicians that a deformed or mutilated mouth destroys itself by its badly related parts, according to the same principle by which the heart is weakened and destroyed when its parts are so impaired that it is forced to compensate for a lack of mechanical perfection.

Physicians are boasting, and justly so, of their efforts and successes in preventive medicine. General sanitation, hygiene, immunology, diet, endocrinology, etc., have worked wonders in many ways. Smallpox, malaria, typhoid fever, diphtheria, yellow fever and leprosy have been almost completely controlled. Developmental and growth disturbances have been greatly reduced. Even tuberculosis has been dethroned as the white man's plague.

But the degenerative diseases of middle life remain as the curse of mankind. The

mouth has received its share of the blame for these degenerative diseases. If one-half the blame laid on the condition of the mouth is deserved, the preventive and curative effects of the most simple dental remedies should no longer fail to attract the notice and appreciation that they deserve. The discoveries and statements of Rush, Hunter, Billings, Rosenow, Hayden and many others should find their answer in a unified recognition of masticatory pathologic conditions as clinical entities by physicians and dentists everywhere.

DENTISTRY AND SYSTEMIC ILLS

Benjamin Rush, as long ago as 1809, called attention to the systemic effects of oral lesions and advocated the extraction of teeth in the following language: "I am disposed to believe they (the teeth) are often the unsuspected causes of general, and particularly nervous diseases. I cannot help thinking that our success in the treatment of all chronic diseases would be very much promoted by directing our inquiries into the state of the teeth in sick people and by advising their extraction in every case in which they are badly decayed."

Is it not a pity, and almost incredible, that the discovery that the morbid conditions of the mouth were a source of degenerative and infective diseases was not accompanied by the logical deduction that one way to prevent them is to forestall or intercept the oral lesions that create them? The care of the teeth is sometimes mentioned, but the purpose of the teeth is in no sense stressed in such a way that there is any real regret connected with their loss. The emphasis is all placed on the good effect of "curing" the body by ridding it of the offending teeth. The medical and surgical regard for the teeth closely approaches the attitude toward the tonsils and the appendix. I have never been able to understand why the writings of medical and dental essayists who discuss the relation of medicine and dentistry never mention the need for this basic preventive measure: the biologic care of the teeth.

A COMMON MEETING GROUND

Diagnosis is the connecting link between medicine and dentistry. It is on the basis of diagnosis that the dentist and physician have a definite meeting ground. It certainly is not the province of dentistry to invade the field of general medicine, but when the dentist sees a child, or an adult, suffering from caries or any other dental disorder, his knowledge of diagnosis should prompt him as to when to enlist the help of the physician. Dentists must realize that, in order to do this, dental diagnosis must mean more than counting and listing the cavities, more than determining the type or kind of material to fill them and a calculation of the probable cost.

Many dentists in recent years have attempted to become dietitians. Would they have so invaded the field of general medicine if their knowledge of the general principles of diagnosis had been sufficient to fortify them against such mistakes? The question of diet is such a small part of the systemic factors to be considered that physicians cannot fail to question the intelligence of such an attitude on the part of the dentist.

As dentists, we have the right to expect and demand that the physician's knowledge of the general principles of diagnosis enable him to know when and where to refer his patients for dental treatment. The physician must recognize the connection between systemic diseases and specific ailments, such as dental disorders, and be able to enlist the aid of the dentist or other specialist to augment his general treatment. The converse of this rule is

also true. If the patient sees the dentist first, the dentist should be able to know when and where to refer his patient for general or systemic treatment in order to augment his dental treatment.

A PROPER DENTAL CONCEPT

The practice of dentistry should be considered by medicine as more than a cosmetic luxury. Physicians should not believe that diseases affecting the teeth could be eradicated by removing the offending members if looks were not involved. It should be understood that the teeth are not vestigial appurtenances that can be neglected or discarded without serious consequences to the digestive mechanism. Biologic workers have amply demonstrated that normal growth and development, robust adulthood and favorable old age are dependent on the small and almost infinitesimal factors of our life processes, such as vitamins and endocrines. The many cases of general decline and ill-being of people who lack the chewing function and the apparent benefit conferred on them by the restoration and maintenance of this function constitute a clinical argument that can hardly be denied.

Therefore, every factor contributing to the development and natural maintenance of the teeth and a healthy normal functioning of the mouth should be promoted to the fullest extent. But however important any and all such healthy promoting measures may be, the fact remains that the real problem, duty and purpose of the physician and dentist is the early recognition and successful interception of disease, thereby preventing the natural ravages and dire consequences of its untreated progress.

As so many, if not all, of the somatic ills attributed to the mouth could be so successfully intercepted by the proper and timely application of dental remedies, it seems self-evident that good dental treatment stands today as the most prominent and promising health measure of the healing arts. That famous "next great step in medicine" may be taken with seven league boots by the consideration and treatment of masticatory disease as a clinical entity. Dental education holds the answer. What will it be?

Infantile Scurvy.—Infantile scurvy should become so rare as to make diagnosis increasingly difficult from lack of opportunity for observation of clinical cases. According to Park there is a long latent period during which scurvy may be manifest in the skeleton without recognizable symptoms. There are thus no known early signs of scurvy. Slight roentgen changes at the epiphyses and the scorbutic deformity of the rib are sometimes useful in making an early diagnosis. The chief reliance must still be placed on symptoms; of these, pain and tenderness in the legs are the most important. Every infant known not to have received antiscorbutic substances for over two months should be held under suspicion. An allied problem that has been the subject of much recent investigation is the relation of vitamin C to the structure of the teeth. Pitts points out the most important difficulty so far encountered in the experimental studies: the animals heretofore used present fundamental dental or other differences from man. Malnutrition and latent scurvy are discussed by Frölich of Oslo, the vitamin C content of the liver of new-born infants by Toverud, the pathogenesis of scorbutic dystrophy by Rohmer and Bezssonoff of Strasbourg, and the anemia of infantile scurvy by Parsons and Smallwood of Birmingham. All in all, these admirable discussions of infantile scurvy could not come at a more appropriate time or in more convenient form.—*J.A.M.A.*, Oct. 12, 1935.

RELATION BETWEEN DENTAL AND MEDICAL EDUCATION*

By L. E. BLAUCH,† Ph.D., Chicago, Ill.

THE CHANGING POINT OF VIEW IN DENTISTRY

AMONG the learned professions, there has, within the present generation, probably been no other development that is so striking as the changing point of view in dentistry. The responsibilities of the profession have undergone a remarkable expansion, the like of which has not been noted in any other field of professional service.

In the not distant past, dentistry consisted principally of restorative service. It was looked on as a handicraft. An enlightened view of the responsibilities of dentistry today and tomorrow regards it primarily as a health service. This view has recently been significantly expressed by reference to the new dentistry as a phase of preventive medicine.

The modern point of view regarding this matter was clearly stated by William J. Gies in 1926, when, in a report to the Carnegie Foundation for the Advancement of Teaching, he said that, although the practice of dentistry cannot be made an accredited specialty of medicine, it should be developed into "the equivalent of an oral specialty of the practice of medicine," adding:

> In this view of an enlarged dentistry, its practitioners would be trained to give the service not only of dental surgeons and dental engineers as at present but of oral sanitarians and oral physicians as well. Instead of examining only the teeth and mouth of a patient, as is now usually the case in a restricted view of their responsibility, they would also suitably enquire into and keep records of the state of the patient's health, particularly as it affects or is modified by conditions of the teeth and mouth. Dentists would plan their procedures to meet not only the local indications but also the possible requirements of extra-oral relationships; would also recognize and note the significance of outstanding symptoms of systemic disease, and warn or advise the patient accordingly, or explain his need for a physician's attention; and could effectively discuss, with a physician, the oral conditions in their relation to a patient's general welfare. Prevention of disease at all ages would become an inherent and predominant motive.[1]

Behind this view lies an interesting history. For many years, a few students and writers in both the dental and the medical profession called attention to important health relationships of dentistry, but it was not until after the beginning of the twentieth century that either profession took much serious notice of it. Several lines of progress help to account for the new view.

The first development which helped to

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†Executive Secretary, Curriculum Survey Committee, American Association of Dental Schools.

1. Gies, W. J.: Dental Education in the United States and Canada, Carnegie Foundation for the Advancement of Teaching, Bull. 19, 1926, pp. 15-16.

change the point of view regarding dentistry had to do with bacteriologic study. Through the work of Pasteur, Koch, Eberth, Klebs and many others, the germ origin of infectious diseases was definitely established. The first marked influence of this point of view on dentistry came through the work of W. D. Miller who, in 1889, published in German his classic work on micro-organisms of the mouth.[2] His work was a great step forward in the application of scientific methods to the study of dental disease. He was soon followed by other workers in this field, notably G. V. Black and J. Leon Williams, with the result that a voluminous literature has been produced on the problem of dental caries. Also, the studies of bacteria in the mouth emphasized the mouth as a portal for the penetration of bacteria into the body. Miller later (1891) published several papers on the human mouth as a focus of infection, the titles of which are significant as indicating that a new obligation was pending in dentistry. A natural result of this work was an emphasis on bacteriology in the education of dentists.

A second line of development—perhaps, rather an extension of the one already mentioned—bears on the evolution of modern dentistry as related to the principle of focal infection. As early as 1890, Miller stated that the conviction was growing continually stronger among physicians as well as dentists that the human mouth as a gathering place and incubator of pathogenic germs performed a significant rôle in producing varied disorders of the body. Also, it was thought that if many diseases whose origin was enveloped in mystery could be traced to their source, they would be found to have originated in the oral cavity. It was not until after William Hunter's famous arraignment of so-called "conservative dentistry" in an address at McGill University in 1910 that the two professions were ready to accept the principle.

Specifically, Hunter claimed that many dental prostheses, such as fillings, crowns and fixed dentures, formed a veritable mausoleum of gold over a mass of septic material to which there was no parallel in the whole realm of medicine or surgery.[3] The chief feature of this particular septic oral material, he said, was that it entered the body by swallowing or by absorption into the blood stream and lymphatics and produced disturbances in remote parts. He reported that the worst cases of anemia, gastritis, colitis of all kinds and degrees, obscure fevers of unknown origin, purpura, nervous disturbances of all kinds, chronic rheumatic affections and kidney disease were those which owed their origin to, or were gravely complicated by, the oral sepsis produced in patients by these gold traps.

Hunter's contention was rather clearly substantiated by studies and reports made by Frank Billings and his associates. Although, in his earliest report, Billings gave attention primarily to chronic infections of the tonsils, sinuses, gallbladder and genito-urinary tract, he stated that abscesses of the gums and alveolar sockets, pyorrhea alveolaris and septic types of gingivitis may also cause systemic disorders of various types. The evidence produced by him and his associates tended to indicate so clearly the relation of dental foci of infection to systemic diseases that it carried conviction.

2. Miller, W. D.: Die Mikroorganismen der Mundhole, Leipzig, 1889. (In 1890, the work of Miller was published in English under the title "The Microorganisms of the Human Mouth, the Local and General Diseases Which Are Caused by Them.")

3. Hunter, W. D.: Rôle of Sepsis and of Antisepsis in Medicine, Lancet, 1:79-86 (Jan. 14) 1911.

Both the dental and the medical profession have come to the point where they recognize that the mouth is one of the common portals for the penetration of bacteria into the body and the site for the beginning of many infectious processes. The acceptance of this view places on the two professions a definite obligation to cooperate in those cases wherein the patient is suffering from a systemic disease in which a mouth condition may be a source of the disturbance.

A third development which bears on the changing point of view in dentistry is concerned with the dependence of the health of the mouth on the general health of the patient. This is a field in which, as yet, there is only meager knowledge. The landmarks of progress here are perhaps not so spectacular as those in the development of the concept of focal infection, but there are several with dramatic quality, one of which is the almost romantic discovery of the relation between fluorine and mottled teeth.

More recently, the effects of nutrition on the health of the mouth have captured and held the attention of dentists and physicians. Such recent studies as those on the relation of calcium and phosphorus metabolism to the calcification of bone and teeth and the vitamins and essential amino-acids to deficiency diseases, and the probable relation of diet to dental caries, suggest a new approach to the problem of prevention and treatment of dental disease.

Moreover, there are a number of systemic conditions, other than those directly related to nutrition, which have marked manifestations in the mouth. The dentist is concerned in two ways with these oral manifestations: 1. The success of the service in the mouth of the patient is not infrequently dependent on the diagnosis and management of the systemic disturbance. Diabetes mellitus is a case in point. 2. The dentist as the guardian of the health of his patients owes it to them to note signs of the onset of disease and advise them to seek treatment.

A fourth development that has helped to revolutionize the practice of dentistry is the discovery of the roentgen rays and their application to the study of dental problems. The introduction of the roentgenogram has probably been the greatest single factor in promoting correct and adequate diagnosis of dental conditions and the investigation of dental problems. The use of this important diagnostic aid is today a routine procedure in all modern dental service. It is focusing attention on what has for a long time been the weakest spot in dentistry; namely, diagnosis. The use of roentgenograms in the diagnosis of oral conditions and in research on the problems of oral health has been a great factor in bringing the dental and the medical professions into cooperation in their service.

PLANS FOR DENTAL EDUCATION

These developments, together with others that might be mentioned, have led to considerable discussion of the need for adjusting dentistry to its new responsibilities, with special reference to training the future dentists to practice their profession in cooperation with physicians and other health workers. In these discussions, many persons have deplored the separate organization of dental schools. They have argued not only for bringing dental education within university control, but also for making dental training specifically a part of medical training. In some quarters of medical education, the problem of training future physicians to cooperate fully with dentists has also been recognized.

A group of proposals for the future development of dental education have carried the name "stomatologic." One

plan was to require a full medical course and a postgraduate training in dentistry for all who were preparing to practice dentistry.[4] This plan was similar to that prevailing in a few European countries. Another proposal was to give to a small group all the fundamentals of a medical training and much specialized training in dentistry, the persons so trained to be known as stomatologists.[5] This proposal also included the training of many dentists in short courses, concentrated perhaps on one specialty in dentistry. These dentists were to operate under the supervision of stomatologists in clinics.

In contradistinction to these proposals, the Carnegie report on dental education in the United States and Canada suggested that the interests of the public would be best served by developing dentistry as an autonomous profession and making it the full equivalent of an oral specialty of medicine. Such a development, it was pointed out, required the incorporation of more basic science in dental education, increased attention to clinical medicine and the correlation of clinical dentistry and clinical medicine. This suggestion appears to be the one that dental education will follow, at least in the near future.

An echo of the stomatology proposals was heard in 1932 when the Commission on Medical Education, in its final report, gave passing attention to dentistry.[6] It considered the proposal to make dentistry a graduate specialty of medicine, requiring all practitioners to complete a full medical course before proceeding to the special training in dentistry. The commission doubted that the requirements of practice or the needs of professional education demanded such a long training. Also, the commission considered the suggestion that dentistry should be developed as a specialty of medicine on the basis of the two years of medical science "provided in a few of the leading schools of dentistry," and it concluded that this base was too narrow for the creation of a real specialty in medicine, since many of the aspects of medicine of greatest value in the diagnosis and treatment of diseases and abnormalities of the mouth are taught in clinical courses, which are not presented in the earlier part of the medical course.

The commission concluded by stating that "it would seem logical that dentistry should be developed under medical education, but with a form of training adjusted to the actual needs of that subject." The suggestion was made that the training of dentists should be qualitatively as high as training in medicine, but somewhat different in content, and that it should provide the student of dentistry with an understanding of the relationships of oral conditions to other fields of clinical medicine.

Although the suggestion that dentistry should be developed under medical education was rather indefinite, it was at once attacked by dental educators and authoritative dental education bodies. It was stated that the suggestion made by the commission had not been influenced by an intimate knowledge of the peculiar requirements in dental education and practice; that, in a complete surrender of the dental curriculum to medical supervision, there would be a lessening of training in certain very important dental services, and that there was no evidence in former or present attitudes of medicine

4. Asgis, A. J.: Stomatological-Medical and the Dental-Autonomous Plans of Education for Dentists, Atlantic M. J., 29:325-336 (Feb.) 1926.

5. Owre, Alfred: Discussion, J. D. Res., 11:385-403 (June) 1931.

6. Final Report of the Commission on Medical Education (Office of the Director of Study, 630 West 168th Street, New York, 1932) pp. 216-217.

toward dentistry that subjecting dental training to medical supervision would improve the quality of oral health service.[7]

At present, there are thirty-nine dental schools in the United States. All except four of these schools are constituent parts of universities or medical colleges, thirty-two of which also operate medical schools. Various relations are found between the medical and the dental schools in their respective universities. Each dental school has its own dean, with one exception, in which case the dean of the medical school is also the dean of the dental school, the latter school having an associate dean.

These discussions might lead one to infer that the major problem is the administrative relation between dental and medical schools. Such is not the case. In fact, the administrative set-up is probably only a minor matter, except perhaps as it may be a question of economy.

THE REAL PROBLEM

The real problem is (1) so to train dental students that, as dentists, they will render adequate health service in the mouth, taking into account the systemic relationships of the mouth in health and disease, and (2) so to train dental and medical students that, as dentists and physicians, they may work together in promoting and protecting the health of the people. The remainder of this paper is devoted principally to the second part of the question.

If future physicians and dentists are to learn to correlate their efforts, medical and dental educators should appreciate the need for cooperation between the professions, understand how to educate both medical and dental students to promote proper relations between the two professions, and adjust their educational programs to meet the demand. This is not primarily a matter of an administrative arrangement; rather, it is one of the character and quality of the training provided.

There appear to be three aspects of the problem. For one thing, dentists and physicians should be trained to cooperate in the treatment of disease. At present, there is a gap between dentistry and medicine, which has been called a veritable "no man's land." Until recent years, this gap has been generally ignored by both professions. The training of neither the physician nor the dentist gave much consideration to this field, and the separation of the two professions through their separate licensure, legal autonomy and separate associations has brought about a situation in which dentists and physicians have spoken almost separate languages, with neither comprehending what the other was saying.

But this situation is changing. There is now a widespread appreciation that dental service is not only concerned with procedures in a limited localized field, but is also definitely related to the general health. Also, there is an increasing appreciation of the fact that constitutional alterations may exhibit oral manifestations that are important in themselves and may, directly or indirectly, influence dental treatment. The service of the dentist to his patients in many instances involves an understanding of these matters. The result of these trends is that there are now frequent consultations between physicians and dentists, and there is a decided tendency toward closer cooperation between the two professions, even though at present there is less than is desirable for the best interest of the patients of both the dentists and the physicians. This cooperation has two sides: (1) the dentist frequently needs

7. Robinson, J. B.: President's Address, Proc. Am. Ass'n. D. Schools, 1933, pp. 50-56. (See also p. 190.)

the services of a physician to assist him in the diagnosis and treatment of cases or to take over cases that come to him but which require medical rather than dental treatment, and (2) the physician needs the assistance of the dentist in cases that involve oral problems.

Physicians have through a questionnaire supplied information for the curriculum survey indicating the diseases and disorders which they refer to dentists for treatment or for which they call dentists in consultation. From this inquiry, it appears that they call on dentists for assistance in dealing with many oral abnormalities, particularly those that are directly related to the teeth and jaws. Developmental anomalies of the teeth and their supporting tissues are very largely turned over to the dentist by the physician, but, in many of these cases, cooperation between the dentist and the physician is indicated. Some of these developmental anomalies, it is now known, are the oral manifestation of a systemic disturbance which the dentist is likely to see before it reaches the physician. Other pathologic conditions of the mouth, such as diseases of the bones, neuralgia, stomatitis, disorders of the maxillary sinus, ankylosis of the jaw, tumors and cysts, are among the diseases on which the service of dentists and physicians may advantageously be combined. In this same category belong injuries to the mouth and their effects. Apparently, the dentist should be well informed on practically every abnormality that occurs in the mouth. Physicians indicate also that systemic sequelae of oral conditions, particularly of oral infections, call for cooperation between the two professions.

Another aspect of the problem suggests that dentists and physicians should be trained to work together in the preservation of health and the prevention of disease. The trends in the demand for both dental and medical service are definitely in the direction of prevention. There is reason to believe that enlightened laymen are in some respects more awake to this need than are some physicians and dentists.

A lawyer, in a recent letter to the Curriculum Survey Committee of the American Association of Dental Schools, made the following statement:

> The average dentist does not get sufficiently interested in a patient until he has an abscessed tooth or needs an extraction. I have found it difficult not only in one office but in many offices to get my teeth examined and cleaned. I never found it difficult to get one pulled. I try to get an examination twice a year. I generally get a rather short and unsatisfactory examination—a partial cleaning with instructions to come back and this repeated half a dozen times. I have compared the dentists with the garages. I take my car in for a check up—the garage advertises and advises it. I get practically nothing; I leave and the squeaks are still there; the water pump still leaks and whatever good might be accomplished by timely attention is neglected. However, if I get into a smash-up with another car, the same garage will come swiftly to the scene, night or day, very efficiently equipped; will take in my wrecked car and rebuild it, put on new wheels and get me a new motor or do whatever is necessary. I mention this to illustrate what I think of dentists, and please remember that this is not one dentist but at least a dozen who have fallen under my personal observation and who have done work for me.

This is not a rare statement; its general tenor is found in numerous others.

And let no one think that when the public talks of preventive health service, it is merely using fine phrases and talking glibly in general terms about matters which it cannot understand and appreciate. A comparatively short time ago, almost no one thought of consulting a

physician except for a specific illness. One was usually confined to bed before it was thought necessary to consult the doctor, and few persons called on the dentist until they had a toothache. Yet, in a short space of time, men, women and children have begun to visit the physician and the dentist simply to be assured that all is well. An increasing number of persons have been converted from the belief that the physician and dentist can cure only specific ills to the realization that they can prevent many ills to which the human race is heir.

We are arriving at a new comprehension of what health is. We are learning that it is not merely the state in which the individual is not a prey to specific disease, but it is also the state in which he is free from the handicap of lowered vitality or impaired efficiency due to slight systemic disorders. Health is to be regarded as that state of well-being in which it is possible for the individual to function to the highest degree of efficiency; in other words, the state wherein there is no room left for disease.

The simple fact is that both medical and dental practice have been, and are even today, mainly directed toward the treatment of disease rather than the maintenance of health and normal function. This is perhaps more notably true of medicine than of dentistry. Men connected with medical education state that the emphasis in the training of physicians tends to be on the hospitalized, rather than the ambulatory, patient, and that not nearly enough attention is given to patients who have apparently no serious complaint, but have so-called minor ailments or do not feel well. In other words, training for preventive health service appears not to receive the attention that it should have if physicians are to do their full duty in promoting and preserving the health of the people.

The changing point of view regarding health service demands that physicians know how to examine a healthy person, estimate his health potentialities and note the obscure signs and symptoms of the onset of disease long before the disease has done serious damage. Also, it demands that dentists be adequately trained to perform a similar service for the mouth of a patient. Furthermore, it demands that physicians and dentists, as guardians of the health of the people, shall work together, each supplementing the service of the other; for it is entirely obvious that there is no such thing as adequate preventive health service without both medicine and dentistry. Dentistry and medicine are probably more closely related in preventive than in any other aspects of service. It would appear that the concept of prevention, when it is fully realized, will inevitably bring about very close cooperation between the two professions.

A third aspect of the problem pertains to the social and economic relations of dentistry and medicine; that is, the relations of the professions to society. One need not be very alert these days to realize that there is great public concern over the question of adequate health service for the entire population. In this entire discussion, both dental and medical services are being considered. The Committee on the Costs of Medical Care gave much attention to dental, as well as to medical, care. It included under the term medicine "the private practice of physicians, dentists, nurses and other individuals, and the work of all types of medical and public health agencies." This combination of medical and dental service in the discussions of the care of the health of the public will undoubtedly have a profound effect in the future in relating the services of dentists and physicians. It is to be anticipated that

dentists and physicians will be found at work side by side in trying to devise and operate ways and means for rendering adequate service to all the people.

DENTAL EDUCATION AND THE PROBLEM

For dental education, the problem appears to be twofold. First, the dental student must be trained as a first class dentist. On this point, there can be no compromise. Unless he excels in the service that is traditionally within his field—that is, adequate care of the mouth in health and disease—he cannot expect to command the respect of physicians. He must know the mouth thoroughly in all its relationships. Secondly, the dental student should acquire (*a*) a fairly extensive knowledge of the basic sciences, (*b*) a broad understanding of the problems of clinical medicine which are related to clinical dentistry and (*c*) a comprehension of the functions and relations of dentistry and medicine in society.

The dental student should have adequate training in the basic sciences, which includes more than training in those subjects that are strictly dental. He should have a broad knowledge of the human body, with particular reference to those matters with which he as a dentist will have to deal. This does not necessarily involve such extensive knowledge of these sciences as the physician is required to have. In fact, it would not be economical to burden the dental student with so much expense and expenditure of time when he will have almost no particular use for much of the knowledge acquired. What is obviously needed on the part of the dentist is a knowledge of fundamental physiologic and pathologic principles and processes sufficient to understand the mouth thoroughly and to comprehend the relations between the mouth and the remainder of the body.

It may be observed that the adjustment of the basic sciences in dental education to the needs of the dental student and at the same time to the limitations of time imposed by other subjects of the dental curriculum has for some time constituted one of the major problems of dental education. The only way out of the difficulty seems to be to analyze the requirements of dental practice and dental education in terms of dental health needs, and then to select from the sciences those facts and principles which are essential for preparing students to begin dental practice safely and satisfactorily, with due regard for all its health relationships.

Fortunately, much progress is being made in this matter. Important recent studies have helped to create a body of material in the sciences that can be used to vitalize the instruction of dental students. Furthermore, the young men who are taking up the clinical teaching are more and more imbued with the scientific ideal as they come up through the better dental schools.

The dentist should have a broad understanding of the main problems of clinical medicine and the correlation of clinical medicine with clinical dentistry. This demand argues for instructing the dental student in the principles and practice of clinical medicine and in the relations of the various forms and aspects of dental service to medical practice.

That dental educators are beginning to appreciate the need for equipping their students to assume their responsibilities in relation to medicine is evident in the recent addition to the dental curriculum in a number of dental schools of instruction that is intended to correlate medicine and dentistry for the student. Study of the catalogs of the dental schools in the United States and Canada shows that a large majority of them offer courses which have such titles as "principles of

medicine," "practice of medicine," "physical diagnosis," "preventive medicine" and "stomatology." Other courses covering certain aspects of this field are offered, such as "pediatrics," especially in relation to developmental and dietary problems in children; "dermatology," with reference to oral lesions; "principles of surgery"; and "syphilology."

Among the purposes of this instruction, as indicated by the catalog statements, are the following: (1) to teach the student the practical application of his knowledge of the fundamental sciences; (2) to teach the relation of disease of the mouth to systemic disturbances; (3) to correlate the contacts between medicine and dentistry; (4) to teach the student to recognize constitutional conditions; (5) to prepare the student to recognize the most dangerous lesions and to know when to advise medical consultation; (6) to familiarize the student with fundamental principles and practices in the treatment of systemic disease and to teach him to recognize systemic diseases having oral manifestations; (7) to familiarize the student with diagnostic procedures used to determine the status of the patient's health with reference to his ability to withstand administration of anesthetics or prolonged and severe dental operations.

The catalog descriptions of the content of these courses show that there is almost no agreement as to what the instruction should cover, nor is there uniformity in the time allowed for the presentation of the subject. Thirteen schools devote less than thirty-two hours to class instruction, and eighteen devote thirty-two hours or more to it. Two dental schools include thirty-two hours of laboratory work. One provides twelve hours of clinical demonstrations; one, sixteen hours; one, thirty hours; one, thirty-two hours, and still another, sixty-four hours. One school schedules ninety-nine hours of "ward work" for each student in dentistry.

It has been learned from correspondence with dental schools that a number of them have good working arrangements with hospitals. A few operate clinics in hospitals. Several have arrangements with medical outpatient clinics where students obtain practical training in oral and general physical diagnosis for patients with pathologic mouth conditions.

One way by which the correlation of medical and dental service can be taught effectively is adequate instruction in the diagnosis of oral conditions. Here, much of the instruction in the basic sciences may be made effective by the application to cases of all the types of examinations and tests. It is generally agreed that there is a great lack of this instruction in dental schools, and that this lack is one of the most significant weaknesses of the dental curriculum.

The new course of study in dentistry which has been prepared by the Curriculum Survey Committee of the American Association of Dental Schools contains an outline for a substantial course in diagnosis and another in the principles and practice of medicine.

THE PROBLEM AND MEDICAL EDUCATION

For medical education, the problem is to give the student an understanding and appreciation of the importance of the health of the mouth in its systemic relationships as well as to place him on talking terms with the dentist with respect to dental service. He needs to comprehend the problems with which the dentist deals and to understand how he and the dentist can work together as there is occasion. He should appreciate the strategic position of the dentist in health service for the public.

Medicine has traditionally neglected the mouth. To be sure, the physician

looks into the mouth frequently, particularly at the tongue, that "unruly member" which gives away so many secrets; and it reveals to him important facts. This is about the extent of his observation of the mouth unless rather obvious signs of oral disease are present. He concerns himself very little with the teeth and their adjacent structures.

In order that some idea might be had as to what is being attempted in the way of training the future physicians to cooperate with dentists, a letter was sent to the deans of nearly all the medical schools in the United States, inquiring what they are doing in this matter. A generous number of replies were received.

From the statements made, one may fairly conclude that about half of the medical schools have recognized the problem and are providing some definitely arranged instruction to meet it. Short courses of from four to eight lectures by dentists are given to medical students, dealing with topics in dental pathology, oral surgery and dentistry. The medical clinics of a few schools provide some dental service, and, in several other instances, there is cooperation with the dental clinic operated by the dental school. Several deans of medical schools report that their hospitals maintain dental clinics. Hospital ward rounds, in which a dentist accompanies the medical students and explains the dental relations of the cases, are provided in a few schools.

Apparently, this matter receives only incidental attention in perhaps half or more of the medical schools. The student is taught the principle of focal infection, and he sees occasional cases of it in the clinic, but he receives little, if any, instruction on the mouth and its relationships, or on the problems of dentistry.

One is disposed to agree with the dean of a dental school which is closely related with a well-known medical school, when he writes as follows:

> Until the medical courses place more emphasis on oral conditions and their systemic relationship, there will continue to be an obstacle to cordial cooperation. Among the graduates during the last few years this lack of dental knowledge is the chief stumbling block.

THE DENTAL INTERNSHIP

One of the useful means of promoting intelligent relations between dentists and physicians is the dental internship. The close association with physicians caring for patients and the clinical experience in dental operations obtained in these relationships should add much to the technical ability, maturity of judgment, and self-confidence of the dental student. Perhaps the most valuable of all lessons that he learns concerns the importance of cooperating with physicians. Another valuable contribution of the dental internship is the contact with dentistry that is provided for medical interns. If every hospital would provide one or more dental interships, every medical intern would have an opportunity to learn the value of cooperation with dentists.

Very little accurate information can now be had on the extent of dental internships and dental service in hospitals. The American College of Dentists has appointed a committee to study and report on the subject, so that soon it should be possible to know the real situation. An increasing number of dental internships appear to be available, but there is no tendency to require an internship of all graduates.

CONCLUSION

There is no doubt that, in the interest of the public welfare, dentists and physicians must learn to cooperate freely and fully as the problems of health, both in-

dividual and public, require. Upon the dental and medical schools rests the responsibility, to a very great extent, for attaining this highly desired objective. Some of these schools are providing excellent opportunities for their students; others have not yet assumed their full responsibilities in the matter.

USE OF DRAINAGE CROWNS AND FILLINGS IN RESTORING BONE IN ALVEOLAR ABSCESS TRACTS

By J. J. MOFFITT, D.D.S., Harrisburg, Pa.

THE crown of a tooth is of little value if the area about the apex is diseased. Loss of the natural crown down to the gingival line is not very serious as compared with the loss of the root, which causes irreparable involvements, morphologic and physiologic. Teeth were not meant to be extracted, and it is the dentist's business to know how to preserve them. When a tooth has been shown, on roentgen-ray examination, to have an abscessed area around its apex, and has been condemned by a diagnostician, it is necessary for the dentist, in order to save his patient's teeth, to show that the area can be filled in with new bone and the apical area restored to a normal condition. Figure 1 illustrates a case of this kind. This tooth, a cuspid, had been used as a bridge abutment, and the pulp had subsequently died. A general health survey disclosed an abscess, and extraction of the tooth was ordered. The diagnostician was assured that many similar cases had been successfully dealt with, and treatment of the case was undertaken. The patient, an active business man, wished to have the bridge retained. A large cervical inlay on the lingual surface was removed, access to the putrescent pulp thus being obtained. The root canal was enlarged and cleaned to the apex. A drainage filling was then inserted and, in six months,

Fig. 1.—Wire inserted in cervical cavity.

Fig. 2.—Appearance of case shown in Figure 1 six months after drainage filling was inserted.

the area had disappeared. (Fig. 2.) The diagnostician was satisfied and the patient may live for many years.

CONCERNING DRAINAGE

In the case shown in Figure 3, pus was discharging through a gingival fistula. Specimens incubated showed *Streptococcus viridans*. Several dentists had insisted on extraction, but as the tooth was a central incisor, the young woman did not wish to lose it. The root canal was enlarged and then sterilized and filled. Because it had not responded to former treatments, the apex was removed through the alveolar process and under nitrous oxid-oxygen the area curetted with a No. 11 round bur. Drainage procured through the gums is so satisfactory in these cases that, when slightly packed with iodoform gauze, they will heal from behind, directly across the top of the root. (Fig. 4.) Pericemental membrane forms first and must not be disturbed by drugs, heat or pressure until the pericementum is established. New bone in elderly patients will sometimes transmit roentgen rays for three or four years, but the areas, as tests have proved, are sterile if there is no inflammation or physical discomfort. In this case, pus had been discharging and the area was soft and putrescent. After the bone had been restored, incubation of a specimen from the center of the same area gave a negative result.

Fig. 3.—Central incisor with gingival fistula.

Fig. 4.—Case shown in Figure 3, nine years after amputation of apex. The length of the root is to be compared with adjoining ones.

Fig. 5.—Restored pericementum and bone where apex was removed. Above the gutta-percha root filling is paraffin, which does not stop the roentgen rays.

Fig. 6.—Large abscess under first bicuspid.

In the treatment of abscessed teeth, as in all infected lesions, drainage is necessary. Surgeons do not seal up wounds with tight dressings or plastic insertions. Abscessed teeth with drainage through the alveolar process and gingivae heal

more readily than circumscribed ones. In Figure 5, which shows another amputated apex, is an example of pericementum and bone thus restored. If an abscessed tooth is seeping blood, pus or serum into a root canal, visibly or microscopically, it will heal more readily if the canal is not stopped up with dressings, but kept open. In order to prevent food from being forced into the open root canal, drainage fillings or drainage crowns are used, as indicated.

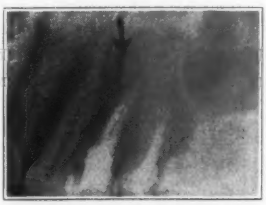


Fig. 7.—Appearance of case shown in Figure 6, ten months later. The arrow indicates the position of the former abscess.

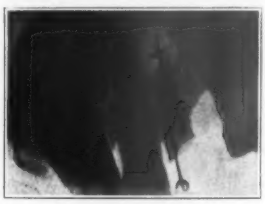


Fig. 8.—Upper right lateral incisor in patient over 75 years of age.

CONSTRUCTION OF DRAINAGE FILLINGS AND CROWNS

The filling or crown is cast to the original shape of the tooth, of gold or aluminum as the case requires. The crown usually has a Steele or other facing. A small opening is made through the occlusal surface of the drainage filling or crown directly into the root canal, for access. Another opening, buccally or lingually, is made into this one at right angles to it. The occlusal opening is closed with a removable filling and the other opening preserves drainage and prevents internal pressure from the healing process. Food particles cannot pack into it. A drainage crown functions similarly. The longitudinal hole is made from the occlusal surface all the way through the post, opening into the root canal; and the right angle hole, entering it near the gingivae, provides a convenient place to insert instruments, if it becomes clogged. In the earlier stages of treatment, the removable occlusal filling in the drainage filling or crown permits changing of the loose dressings if too much discharge makes it desirable. In

Fig. 9.—Case shown in Figure 8, several years later.

most cases, it is best to omit dressings and wipe the root canal walls with a germicide (such as creosote) through the occlusal opening. The germicide must not get outside the apex or it will inhibit cell formation for the new pericementum. Antiseptics must be used in open foramina. A small pellet which contains a germicide may be placed at the inside opening of the drainage hole to prevent possible infection from doubtful oral conditions. To make the drainage holes, graphite from a mechanical pencil may be used, being placed in the casting wax where the holes are wanted and bored

out after the inlay or crown is cast. An end of the graphite is allowed to project from the wax far enough to hold it in place in the investment when the wax melts out. Wires are inserted in the drainage holes in cementing the drainage fillings or crowns in place to prevent the cement from stopping the holes, and removed when the cement has set.

Figure 6 shows a case in which there was a large abscess under a first bicuspid and there were two roots. Cement in the root canals had caused a slight puncture. The upper ends of the roots were putrescent. The patient was to sail for Europe in a few days. The root canals

Fig. 10.—Abscessed lower left bicuspids and cuspid.

were opened, cleaned and sterilized. A drainage filling was inserted and there was no other treatment. When the patient returned, ten months later, there was no sign of the abscess tract and the tooth was filled. An arrow shows the position of the former abscess. (Fig. 7.)

Figures 8 and 9 are from the case of a patient over 75 years of age who had several abscessed teeth, and severe rheumatism from which he thought he would never recover. The affected teeth were all treated by the drainage method. Figure 8 shows the upper right lateral incisor. A removable bridge was constructed having this tooth for its anterior abutment, and drainage was made through the post that retained the abutment, into the bottom of the receptacle that receives the spring. There was no other treatment. Figure 9 shows the case several years later. No teeth were extracted and the rheumatism is entirely gone, which may be incidental.

Figures 10 and 11 represent a case selected because of difficulty of treatment. The lower left bicuspids and cuspid had abscesses. For the cuspid, a drainage filling was made. The other two teeth had drainage crowns. In the lower teeth, it

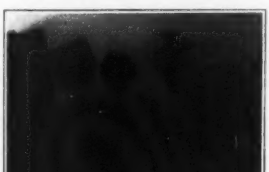


Fig. 11.—Case shown in Figure 10.

is sometimes necessary to open up the root canal by means of the removable filling, but this case would go several months at a time without the necessity of doing so.

PRINCIPLE OF THE DRAINAGE SYSTEM

The extra-apical tissue has been proved to be reconstructive. When the cause of the infection, putrescence in the root canal, has been removed, as in any other part of the body the wound will be healed by natural processes, if drainage is maintained. Heat, dryness, pressure or escharotic drugs are not indicated where restoration of tissue is to be achieved.

STANDARDS FOR DENTAL MATERIALS*

By WILMER SOUDER,† Ph.D., F.A.C.D., Washington, D. C.

A FAD OR A NEED

THE emphasis which is being placed on standards for dental materials[1] by the American Dental Association and the National Bureau of Standards justifies a general survey of the subject. Since the initiation of the cooperative research, standards for materials and technics have been stressed. It was claimed that these would increase the efficiency of the dental operators. Now that we have a number of these standards, it is proper to ask whether the interest is sustained and the prediction supported or the emphasis has been misplaced and the idea of standards is being abandoned. In other words, are standards a fad or a necessity? To answer this question properly, it is only necessary to step back ten or fifteen years and follow some of the phases of this research.

All dentists know that a few dental products of excellent quality have been available for years. There were hundreds of brands on which the dentist had no quality rating other than claims by makers and users. Wranglings between rival makers and rival clinicians left a majority of the dental profession without convincing evidence of the quality of most of its materials. The defective amalgams discovered in 1919, when the National Bureau of Standards initiated its dental research,[2] indicated that there were more defective brands of amalgam alloy than there were safe brands. Since that date, we have discovered poor quality in gold alloys, cements, denture base materials, waxes, compounds and investments. Examples of defective technics are abundant.

A SEPARATE AND NEW FIELD

The expert in standardization is anxious to see the dentist select the best raw materials and use them correctly. He will not attempt to influence the dentist in making a decision as to which type of restoration he shall make. The expert is interested in the qualities of strength, solubility, permanence of dimension, ease of manipulation, appearance, cost and similar qualities.

It has been no easy task to set up standards in a field where definite, comprehensible data were strangers. Thousands of pages of dental literature have been printed as texts, journals and society proceedings, but, with one or two exceptions, there were no data on standardization available when the research was started at the National Bureau of Standards. Proposed standards have invari-

*Read before the Section on Therapeutics, Pathology and Research at the Seventy-First Annual Midwinter Clinic of the Chicago Dental Society, Feb. 20, 1935.

†Chief, Dental Research Laboratory, National Bureau of Standards.

1. Messner, C. T.: Aims and Accomplishments of Research Commission, J.A.D.A., 21: 1554-1565 (Sept.) 1934.

2. Souder, Wilmer, and Peters, C. G.: Physical Properties of Dental Amalgams, Technologic Paper No. 157; Dental Cosmos, 62: 305-335 (March) 1920.

ably been accepted as targets for criticism, some of which has been sincere and profitable. Apparently, few students or teachers of dental science cared to venture into the field of battle where there were so many trained scalpers. Improved laboratory equipment and advances in other fields of science makes this today a much safer and more productive field for research.[3]

ADVICE AND COOPERATION OF DENTISTS

Throughout the last hundred years, dentists have frequently made restorations that were permanent and satisfactory. These restorations are the justification and stimulus for more intensive study. A complete understanding of the "how" and "why" of these restorations will furnish the data for standards.

It is no discredit to the research worker when he asks a successful dentist what brand of material he prefers and how he manipulates the material. The dentist interested in the advancement of his profession is glad to give the information, knowing that it will be compared with statements from others who are also rated as successful dentists. The data must be studied and the best values averaged, but this method of averaging is quite different from averaging data from all products on the market. In explanation, I give you average values for two items on amalgam, using all brands tested in 1919: average dimensional change at the end of twenty-four hours, 2 microns per centimeter shrinkage; average flow, 10 per cent. No one would care to accept responsibility today for such a specification. Those of you who have followed our efforts know that we now ask for 8 microns (plus or minus 5 microns) expansion at the end of twenty-four hours and less than 4 per cent flow. There are over a score of amalgam alloys now guaranteed by their makers to meet this requirement.[4] The research laboratory workers are as proud of this showing as are the makers of these alloys. This is typical of the results which are following for other materials.

Manufacturers are accepting the idea of testing their products and are using accurate machines for the tests. How many times in the last two years have you seen in manufacturers' exhibits at the Chicago Dental Society interferometers and testing machines which were expensive to purchase and expensive to transport? They were there and in operation for your inspection. Your exhibitors are striving to entertain and instruct the profession in a scientific manner. We must all fall in line and cooperate, for our interests are all the same; namely, the best dental service in the world for the citizens of our nation.

SCIENTIFIC LABORATORY A CONSTANT NEED

You may ask why the National Bureau of Standards and the American Dental Association should continue in this research after standards have been set up. The days of confusion and unjustified claims have not disappeared completely. The dentist still needs a method by which he may verify claims for new products and, in certain instances, verify or disprove the data offered for his use in selecting and using his materials. The cooperative research furnishes this service. You are familiar with the certification plan[4] whereby the maker supplies a certificate or guarantee that his product will be kept up to stand-

3. Souder, Wilmer: Fifteen Years of Dental Research, J.A.D.A., 21:58-66 (Jan.) 1934.

4. Paffenbarger, G. C., and Sweeney, W. T.: Specifications and Certifications for Dental Materials, J.A.D.A., 21:658-664 (April) 1934.

ard. In most instances, certified products are kept up to standard, but occasionally a bad lot gets on the market. The research associates of the American Dental Association usually find the defective lot by purchase or by a communication from one of the wideawake dental schools which has equipped its laboratory for research and testing. Competitors sometimes submit data to show that a rival's product is out of line. The American Dental Association, assisted by the Bureau, goes into action and, through independent testing, establishes the facts. The defects may have resulted from accident, carelessness or lack of proper control, or there may have been a flagrant disregard for truth regarding the product. Each case of error must be handled on its merits and in such manner that the interests of the dental profession will not be compromised.

When the violation is flagrant, the Federal Trade Commission is ever ready to step in and handle the case. Excellent service has already been secured from the commission. Within the last month, a misbranded product was submitted for its action. We have no reason to anticipate other than a satisfactory termination of the case. The American Dental Association has, through information secured at the National Bureau of Standards, aided in stopping the sale, at a price 100 times its value, of an aluminum bronze alloy recommended as a gold substitute and the sale of 100 small pieces of asbestos with the "latest findings from the Bureau" for $5, and has caused a manufacturer to cease guaranteeing his alloy to comply with specifications when in fact it did not comply.

On the positive side of this cooperation, we have instance after instance of cooperation with schools in the selection, installation and standardization of equipment,[5] similar cooperation with many manufacturers and messages of appreciation for assistance rendered. Practically all manufacturers have improved their product during the last five years. So noticeable have been these improvements that it has been possible to revise some of the specifications to a product of higher quality. This part of the research has been very active.

Perhaps I have been too tedious in my analysis of standards for amalgam alloy and in my explanation as to how standards are guarded, using amalgam alloy as the example. Further discussions will be more general.

BETTER CASTINGS FROM STANDARD MATERIALS

The specification or standard for dental investment[6] will bear the same thoroughness of analysis. Dental gold alloys shrink when cast. Most dentists accept this without question, and at once look about for means of compensating this shrinkage. Investments having expansions of 0.7 per cent or over on moderate heating were found to be available without unnecessary expense or difficulty of manipulation by the dentist. This value of 0.7 per cent expansion was at once entered on the specification and is sufficient to correct most of the gold shrinkage. Discoveries of special mixing and investing technics enable the dentist to compensate completely the shrinkage of gold alloys. The reasons for the strength and fineness requirements for dental investments are obvious and need no lengthy defense. Exact data on gold shrinkage, investment and wax expansion have solved 90 per cent of the inlay prob-

5. Souder, Wilmer: Laboratory Experiments, J.A.D.A., 16:1829, October, 1929.

6. Dental Research Fellowship, J.A.D.A., 20:1040-1042 (June) 1933.

lems.[7] The chronic inlay clinicians with moderately accurate inlays are now replaced by men who have mastered the science and who, through the use of standardized materials, have produced without difficulty and repeatedly inlays which fit with unbelievable accuracy. A visible cement line would shock these operators.

Similar standards are available for the inlay casting gold alloys.

STANDARD NEEDED FOR CAST CLASP ALLOYS AND A TARNISH TEST

I must admit that we do not have a finished specification for cast clasp gold alloys. We have offered the gold manufacturers an opportunity to suggest a specification for these alloys, but have not received sufficient aid to justify an attempt at setting up a specification. Obviously, we shall have to go back to the method outlined previously and consult the users of clasp gold to find which brands they regard as best, then test these brands and assemble proper quality standards into a specification. One item which must be in this specification is bothering us now. It is a tarnish or stain requirement. Mr. Isaacs[8] conducted certain tests using various solutions and atmospheres in an attempt to specify a quick method to decide whether an alloy would tarnish from the presence of decaying foods, sulphides, etc. Some of the tests were made by placing the alloys in the foods, which were placed in an isolation chamber. Dental schools may assist in this program by repeating these or similar experiments and reporting their data.

The experiments which Mr. Isaacs performed are given here very briefly and in the order in which they were performed.

(*a*) Immerse the alloy in a 30 per cent solution of hydrogen peroxide for twenty-four hours. Observe the oxidation, if present. (*b*) Place the alloy in egg yolk and allow it to remain during decay. Observe strains. The final and apparently most satisfactory test was: (*c*) Saturate 100 milliliters of ammonium hydroxide with hydrogen sulphide gas. Then add another 100 milliliters of ammonium hydroxide and dilute to 500 milliliters. Place clean stops of alloy in a vertical position beside a beaker containing the solution in a closed dessicator. After ninety-six hours' exposure, wash the alloy strips with carbon disulphide, then with acetone, and dry. Compare the color of the exposed strip with a control strip not exposed to the vapors.

If the original color no longer predominates, the alloy should be rejected. A series of gold alloys exposed to the vapor from this solution showed serious tarnish for alloys below 65 per cent precious metal content. A lingual bar marked 16K (but not analyzed) tarnished. Alloys above 70 per cent precious metal content resisted tarnish.

A standard for percentage elongation for the cast clasp and partial denture golds would expose the defect of brittleness inherent in so many of the new alloys offered as substitutes for the gold alloys.

THE WORK BEHIND THE CEMENT STANDARD

Few of you realize the work done by Dr. Paffenbarger and his cooperators in securing data for the zinc phosphate cement specification.[9] I shall not encroach

7. Taylor, N. O.; Paffenbarger, G. C. and Sweeney, W. T.: Inlay Casting Investments, J.A.D.A., 17:2266-2286 (Dec.) 1930. Volland, R. H., and Paffenbarger, G. C.: Inlay Technic, J.A.D.A., 19:185-205 (Feb.) 1932.

8. Isaacs, Aaron: Unpublished research, June, 1934.

9. Paffenbarger, G. C.; Sweeney, W. T., and Isaacs, Aaron: Preliminary Report on Zinc Phosphate Cements, J.A.D.A., 20:1960 (Nov.) 1933.

on his work except to mention a few glaring practices and the lack of definiteness in cements and cement technics prevalent at the time the research was begun. Cooperators from various sections of the country sent in mixes of cement which they regarded as satisfactory. Some men used three times as much liquid as others in mixing a given amount of powder. Evidently, some of these operators were not getting the best results from their cements. Are more convincing reasons needed to prove the necessity for standardization? This confusion is one of the reasons for the delay in presenting the cement specification. Apparently, there was not sufficient agreement among the men selected as experts to justify us in setting up standards for cement. The only course open for the Bureau as supervisor of the scientific progress of this research was to discard practically all the data from the cooperators and to insist on fundamental research to establish the difference that accompanied such variations. The cooperators derived considerable consolation from the discovery that part, but not all, of the variations were due to differences in the daily output of manufacturers' products.

The research showed differences in solubility for different mixes. The thicker mixes were not always less soluble. The size of the individual particles of the cement powders was found to be excessive in some cements. And surprising as it may seem, it was discovered that these cements were not appreciably adhesive. This gives the orthodontist and the inlay man a different picture as to how the appliance or inlay is held in place.

After assembling these data, a specification was born and repeat experiments were submitted to the cooperators. The cooperators eventually produced specimens that were in fairly good agreement. You may wonder how the 99 per cent of the dental profession who did not cooperate in these experiments can profit from this laborious procedure, which has now become history, except in the dental schools where students are being taught by repetition of some of these experiments. In the first place, cements are today more nearly uniform, and as soon as the guarantee labels are placed on the packages by the manufacturers, July 1, 1935, we can forget this source of trouble. The variations that have resulted from lack of instructions to the dentist will be reduced to a minimum by those who follow the directions of the manufacturer; for we must not forget that compliance with instructions is a part of every specification and the instructions are inspected before the manufacturer is permitted to certify his product. These high grade cements will to some extent save the reputation of the poor inlay technician. The cement lines between inlay and tooth will not dissolve so rapidly and should give longer service for inlays and fixed bridges.

STANDARDS NEEDED FOR DENTURE BASE

I have spoken about specifications now available. What have we left for future work? One of the most urgent needs is a specification for denture base materials.[10] Dr. Barber[11] will describe to you this afternoon some experiments which he has made on rubber and substitutes for rubber. These substitutes, by reason of their color and translucency, are being demanded by patients in every locality. Tests for these substitutes, rating them against rubber, show us at a glance that, in some respects, they are superior to

10. Paffenbarger, G. C.; Sweeney, W. T., and Isaacs, Aaron: Zinc Phosphate Cements, J.A.D.A., 21:1907-1924 (Nov.) 1934.

11. Barber, Ronald: Newer Denture Materials, J.A.D.A., 21:1969-1985 (Nov.) 1934.

rubber, and, in other respects, they are inferior. Unfortunately, these inferior qualities have displayed themselves very prominently. A specification giving limits on brittleness, fatigue-flexure versus fiber stress, hardness, solubility and a few other similar items will, when available, save the dentist and patient many disappointments. The research associates are pushing this problem as rapidly as possible. The manufacturers and sales agents for two of these substitutes are following this research and are endeavoring to improve the product to the point where it will at least not be inferior to rubber. As in all other items that we have studied, it will be necessary here for the dentist to improve his technic, as there is no doubt that some of the failures on these denture base substitutes are chargeable to the dentist. When the specification is set up, you may be sure that the directions for manipulation will be a necessary part of the specification.

The silicate cements are also receiving attention and should yield a specification within the next year or two. But it is not best to spend too much time in anticipation and promises. Leaders in any profession demand results and unmistakable proof of the results. This proof is not now available for the silicate cements. But there will be another meeting of the Chicago Dental Society.

SUMMARY

1. The idea of standards for dental materials is more than a fad and will be permanent.

2. Amalgam alloys and gold alloys have been improved during the process of standardization.

3. Dental investments and other accessory materials have likewise been improved.

4. Technics have improved for amalgam and inlay golds as a result of the standardization of materials.

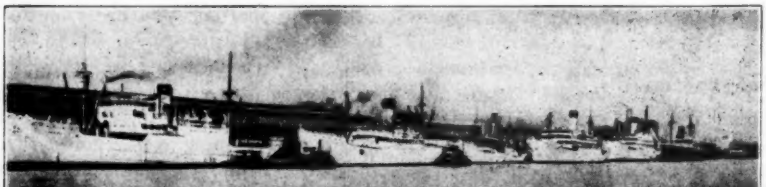
5. Decided improvements will appear or have appeared in cements. After July 1, 1935, all cements carrying the certification or guarantee should be found satisfactory.

6. Improvements in substitutes for rubber denture bases will be noticeable shortly.

7. Defective materials will disappear from the dental laboratory.

8. Dental technics have been made less complicated by the introduction of the research data and standard materials.

9. Prices for standardized materials have not increased above those prevailing before standardization was effected.



Typical New Orleans wharf scene.

A MODERN CONCEPT OF ORTHODONTIC DIAGNOSIS*

By JAMES DAVID McCOY, M.S., D.D.S., F.A.C.D., Los Angeles, Calif.

IN the development of any science, many changes take place. These may come slowly and be of such nature that they can be assimilated without necessitating more than slight readjustments; or they may be so pronounced that previous concepts must be altered or discarded. During such periods of change, it is but natural that varying appraisals will be tendered, and controversies arise both for and against the acceptance of new premises.

A frailty common to most human beings is their proneness to continue to think and act in accordance with the tenets of their early teaching. This mental attribute is evident even among those whose educational background should pave the way to open-mindedness. Even within the ranks of those devoting their energies to the healing arts, many rebel at learning new methods if old ones seem satisfactory and have become more or less a matter of routine. With some, this feeling develops to the point of intolerance, particularly if changing beliefs tend to interrupt the even tenor of their ways.

If the science of orthodontia is to progress, it must continue to build. This will require much in the way of alteration in both its foundation and its superstructure, and some parts which heretofore have been considered stable will have to be discarded and replaced by others based on more rational principles. If the orthodontic problem were as simple as has been represented by popular opinion, the practitioner would not be faced with the grave responsibilities that are his today. To consider orthodontia a mechanical procedure, limited to the movement of teeth into supposed normal occlusal relationships, and "retaining them" in such positions for periods deemed adequate, was, to say the least, a simple way of viewing the question. A lack of knowledge of the complex nature of the problem and the extent of the field involved was responsible for this early and erroneous concept.

Those who practice orthodontia are confronted with the treatment of oral deformities representing a great variety of conditions. While popular conception accords to it the purpose of correcting so-called malocclusion, experience has taught us the inadequacy of this term, unless it be made inclusive of a far greater range of conditions than are represented by malalined and malfunctioning teeth; for we may have any of the following fundamental pathologic conditions conjoining in cases presented for treatment: (1) malposition of teeth occurring singly or in groups with the coronal portions only involved, or with the underlying alveolar supports contributing to and resulting in malformation of one or both dental arches; (2) malrelation of the dental arches; (3) malrelation of the dental arches accompanied by malde-

*Read at the Midwinter Clinic of the Chicago Dental Society, Feb. 27, 1934.

velopment of portions of the maxilla or mandible, or both, and (4) miscellaneous deformities such as maxillary cleft, abnormalities of dentition, i. e., anomalies of form, number and eruption; deficiency or malfunction of muscles and abnormal development of the tongue. From these, we have a fairly accurate picture of the

Fig. 1.—Study in dental and oral anomalies illustrating variety of combinations. In a few, the abnormality is limited to the denture alone, but in the majority of instances the involvement includes the jaws and some of the external features of the face. (Figures 1-7, 12-15 from McCoy, J. D.: Applied Orthodontics, Ed. 4, Philadelphia: Lea and Febiger.)

nature of the problem involved in orthodontic diagnosis. The conditions may occur singly or in a variety of combinations, and while simple dental malposition is by no means rare, we are faced with the fact that, in a large percentage of the cases that we are called on to consider, we are dealing with dentofacial deformities that represent complex morphologic deviations, including not only the teeth and alveolar processes, but also extending beyond these boundaries, involving the jaws and, in many instances, some of the external features of the face. Figure 1 illustrates, in part, this statement.

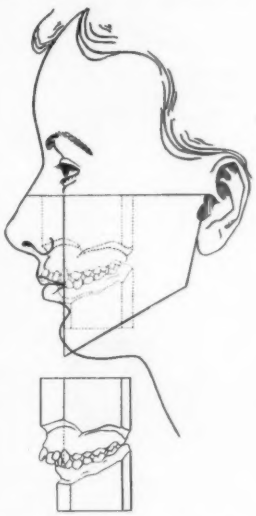


Fig. 2.—Principles of gnathostatic denture reproductions which not only show every desirable dental detail, but also reveal position of denture in face. When made 8 cm. in height, the top of the base of the maxillary cast represents the horizontal eye-ear plane. Markings also show where the transverse orbital and median planes intersect the denture, thus making it possible to visualize deviations in the three dimensions of height, width and length.

The one who attempts, therefore, to meet the problem of diagnosis must endeavor to determine the true character of such anomalies, their extent and the various conjoining parts involved. Only when such facts are adequately visualized is the practitioner in a position to plan the treatment. That our old methods of intra-oral examination and appraisal have proved inadequate in all too many instances is forcefully brought to our attention by failures in treatment. Even if various forms of so-called malocclusion have responded favorably to standardized mechanical treatment, such cases by no means constitute the bulk of practice, and even with such cases, a finer differentiation of anomalous involvements would mean their more intelligent care.

One error commonly practiced in the past has been the all too prevalent custom of confusing or of combining in our deliberations the demands of diagnosis, etiology and treatment. Each should be considered separately and in proper sequence. Diagnosis comprises all methods essential to determine the nature and extent of anomalies affecting the oral ensemble, their character and the various conjoining parts involved. Etiology seeks to determine the various causes responsible for such aberrations of growth, altered structure and function. Treatment strives to apply methods that will restore to natural form and function such parts as have deviated from the normal, the latter being a standard not rigidly fixed, but varying from an average mean and showing differing degrees of perfection. The problems involved in any of these three essential considerations offer a challenge to the most skilful practitioner, and frequently our efforts are not rewarded with the degree of success that we hope and strive for.

Diagnosis, to which this discussion is limited, constitutes one of the big problems of orthodontic practice. No perfect plan has yet been developed, nor is it

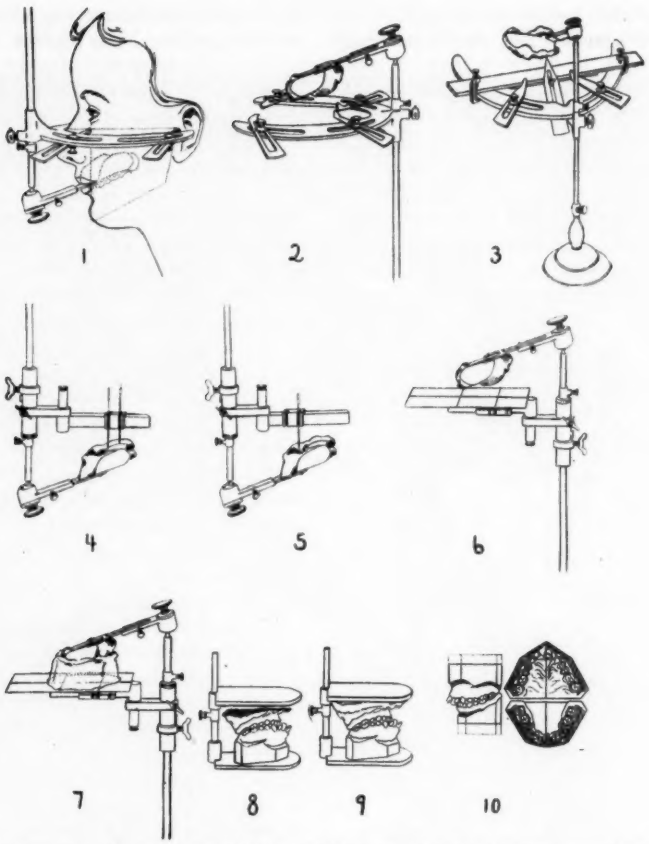


Fig. 3.—Sequence of steps essential in making gnathostatic denture reproductions: (1) gnathostatic facebow in position at time upper impression is taken, locating eye-ear plane of face; (2) impression and facebow removed and placed in stand; (3) orbital beam and pointer in position to locate position where orbital plane intersects denture; (4) locating the raphé-median plane; (5) fixing sliding block in position at orbital plane; (6) platform table in place preparatory to pouring upper impression (orbital and median planes are recorded upon this table in their correct relationship to upper impression); (7) upper impression cast; (8) upper model completed, and lower impression partially cast and occluded with upper teeth preparatory to final casting; (9) final casting of lower model; (10) gnathostatic denture reproduction completed, showing means employed to identify position in face. Such casts are usually made 8 cm. in height, although this dimension may be varied if desired and they may be 6 cm. in height.

probable that we will ever see the day when such a happy circumstance will be realized. Human judgment, rarely infallible, must be called on to some extent to interpret what we see in our cases, and it is, therefore, of vital im-

portance that we approach the question supplied with every helpful means at our command to sharpen our powers of observation and guide our diagnostic endeavors. In an effort to reduce the problem to the most practical form, suitable for everyday use, the following prerequisites will be named and discussed: (1) the consultation and written record; (2) the roentgenographic record; (3) the oral and denture record, and (4) the facial record.

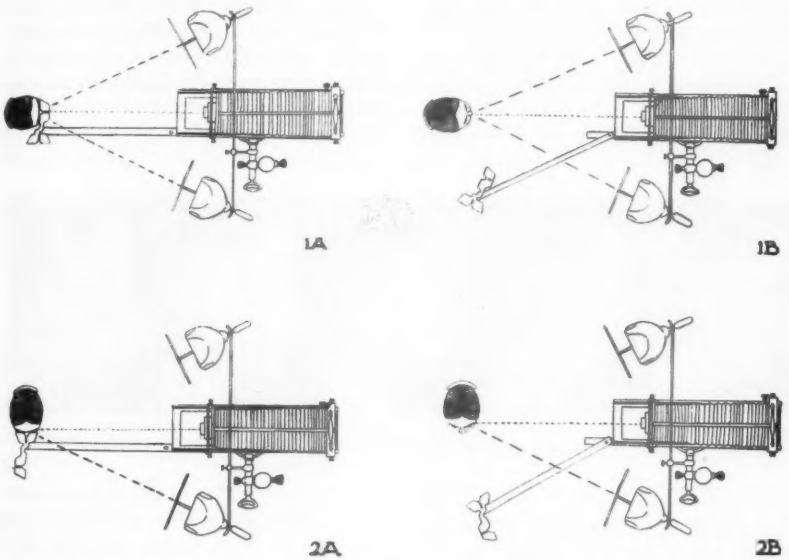


Fig. 4.—Principles involved in use of photostatic clinical camera. The positions for both frontal and profile pictures are shown, as well as the principles of lighting for such photographs.

CONSULTATION AND WRITTEN RECORD

In the discussion of the consultation and written record, that professional contact with patients which we designate as the "consultation" assumes major importance. Unfortunately, this has never been fully appreciated by many of our profession, nor have they demanded for this type of professional service the respect on the part of the public which it deserves. In spite of the fact that it is one of the most important contacts that are made with patients, its present status, in the vast majority of instances, is nothing to be proud of, for it has degenerated into an examination rather than a consultation. Now there is a vast difference between these two, which I will define. An examination may usually be defined as a period during which varying degrees of salesmanship are used to "sell cases" to patients. A consultation is a period wherein the professional man or woman studies the character and extent of oral deficiencies, diseases, malformations, etc., and makes an effort to determine what measures will safeguard the patient's in

terests to the highest possible degree. It is a professional service of a high order and is deserving of a professional fee. Thirty minutes is none too long for this important appointment, for careful histories must be secured and roentgenograms must be made or interpreted and other steps taken which will make it possible for the practitioner to visualize, at least in part, the patient's orthodontic problem. It is rather depressing to consider the manner in which this important function of the practitioner is prostituted in many offices. If our confrères could only realize that their attitude toward this one phase of practice has done more to belittle the profession in the eyes of the public than almost any other single fact, as to whether they approach normal form and function or show deficiencies.

In addition, possible etiologic factors should be recorded, not only as a safeguard during treatment, if it is undertaken, but also as a means of accumulating facts which, in time, will be valuable in proving or disproving their bearing as causative factors. Such clinical evidence, accumulated through a period of years, becomes a source of indispensable information and should include the tabulation of diseases which the patient has been subject to and which might be regarded as predisposing factors in the anomalies present. In addition, certain more immediate suspected determining causes should be included in the record. All this useful

Fig. 5.—Sequence of steps essential to complete charting of photostatic facial reproductions.

they might change their ways. To claim to be engaged in a learned profession and then to fail to have the strength of one's convictions is truly unfortunate.

As a part of the consultation, a written record should be made, containing certain relevant facts, such as the age of the patient, the form and relationship of the dental arches as revealed by intra-oral observation, the teeth and oral forms of the father and mother and other immediate relatives, the condition of the oral soft tissues, the incidence of caries, the number of teeth, whether normal, deficient or redundant, the presence of non-vital teeth, the size of the tongue, the general health, the nose, the lips, the facial muscles, information may be recorded upon a suitable orthodonic record card by merely checking the items named, or briefly writing in such additions as seem pertinent. It is also possible at the time of consultation to indicate a tentative prognosis, and such recommendations as the consultation justifies. As all cases are not treated, and as orthodontists are frequently misquoted by patients, a permanent record of these findings may prove a safeguard of real satisfaction.

THE ROENTGENOGRAPHIC RECORD

An important diagnostic aid universally accepted is the roentgen rays. As the orthodontist is concerned with the

growth of the denture during the period when the development and eruption of teeth play so important a part, and as this process is frequently subject to aberrations, it is obvious that a roentgenologic examination should be a routine part of every diagnostic effort, as well as an indispensable aid during treatment. It must be utilized to determine the presence or absence of unerupted permanent teeth, as a guide in the extraction of deciduous teeth, in determining why permanent teeth are delayed in their eruption, to observe the development of third molars, as a guide to making attachments to unerupted teeth, as a precautionary step and guide in some cases of root movement wherein root surfaces may suffer traumatic contact and resorption be brought about, for the observation of nonvital teeth prior to and during tooth movements, to differentiate between anomalous and normal teeth and perhaps in other conditions which must be considered prior to, or during, treatment.

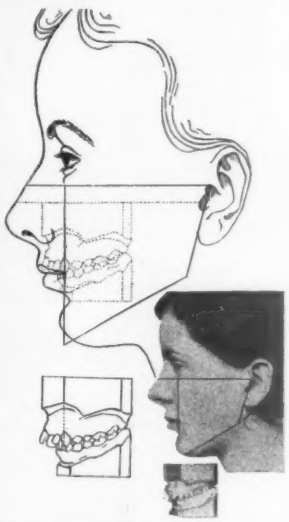


Fig. 6.—Principles of combination of photostatic picture and gnathostatic cast. In this instance, a 6 cm. cast is shown.

THE ORAL AND DENTURE RECORD

The necessity for accurate denture reproduction, or the making of "plaster models," as they are more frequently called, has always been considered not only advantageous, but also indispensable, if an anomaly is to receive diagnostic consideration. These models should furnish, in permanent form, definite information as to the character and extent of the abnormality present in the denture and the immediate underlying bony structures. If properly constructed, these models will afford this information, and, when combined with suitable facial reproductions, the orientation of the denture as regards its dependent structures in the face is shown. That the ordinary plaster casts used in the past have failed to fulfil such requirements will become apparent to anyone who will compare this old type to those obtained with the aid of the gnathostatic methods given us by Professor Simon.[1] Such denture reproductions, made in accordance with cephalometric principles, not only record every desirable dental detail, but also show the dentocranial relations. The principles involved are shown in Figure 2. As the top of the base of the maxillary denture reproduction represents the horizontal eye-ear plane, and the base of the mandibular cast is made parallel to it, and the median and transverse orbital planes are marked on them during their preparation, visualization of existing deviations in the three dimensions of height, width and length is made possible.

In addition to revealing the actual position of the denture in the face, such casts frequently show conditions not ordi-

1. Simon, P. W.: Fundamental Principles of a Systematic Diagnosis of Dental Anomalies, Boston: Stratford Company, 1926.

narily discernible in the old type of record models, such as the angle of the occlusal plane, asymmetric growth manifestations effecting the denture, both vertically and horizontally, and the actual angle of inclination of the teeth, all of which are essential if our best judgment is to be utilized. In fact, to really fulfil their purpose, they should be "realistic" rather than "artistic." There is no reason that nicety of technic cannot be employed in their construction, but, as Professor Lischer[2] has stated, "They are primarily intended for diagnostic data, not as museum pieces."

No attempt will be made here to describe in detail the various steps necessary in their construction, other than to state that accurate impressions made by any one of several satisfactory methods are, of course, essential. Through the use of the gnathostatic facebow, at the time the upper impression is taken, followed by other equally simple and accurate pieces of apparatus, the casts are completed and marked with the measuring planes already mentioned, the whole process requiring less time and effort than is es-

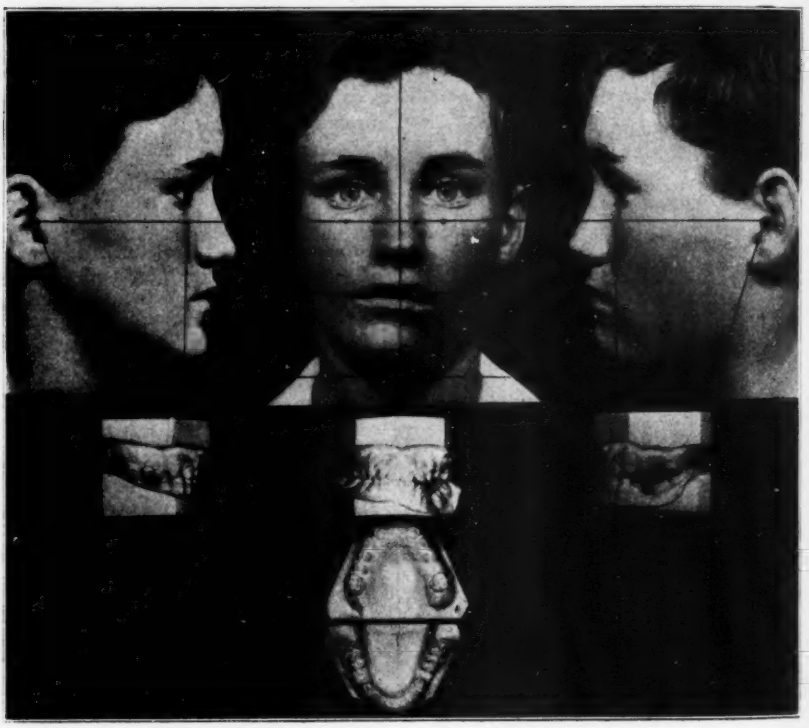


Fig. 7.—Denture and facial record revealing serious anomaly wherein marked asymmetrical development of face and jaws is manifest.

2. Lischer, B. E.: Proc. Am. Soc. Orthodontists, 1933.

sential in making the old-fashioned "unrelated casts." The sequence of technic necessary is illustrated in Figure 3.

THE FACIAL RECORD

With our heightened appreciation of the nature and scope of the anomalies within the orthodontic field, and especially the fact that these frequently extend beyond the immediate boundaries of the denture, some form of facial reproduction becomes essential to diagnosis. These reproductions may be procured by

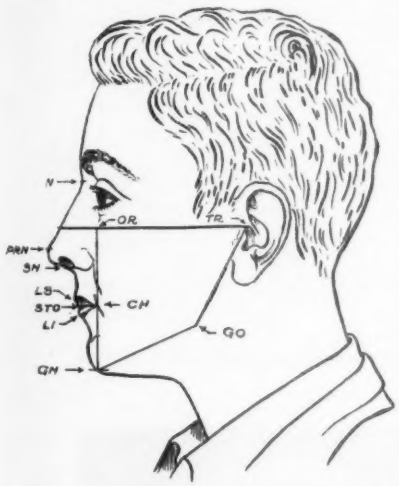


Fig. 8.—Profile points of importance in judging dentofacial relationships. *n*, nasion; *prn*, pronasion; *sn*, subnasion; *ls*, labrale superius; *sto*, stomion; *ch*, cheilion; *li*, labrale inferius; *gn*, gnathion; *or*, orbitale; *tr*, tragion; *go*, gonion.

several methods and in different forms, such as plaster facial masks, x-ray profileographs, profile tracings and photographs; but to be practical for everyday use, they should be obtainable with a minimum amount of effort to the practitioner and of wear and tear on the patient. The photostatic clinical camera and the photographs obtained through its use provide a simple and satisfactory means to this end. The necessary apparatus, when once installed, is easily and accurately operated, and the records obtained are as useful and essential as denture reproductions. As a matter of fact, one supplements the other, and both are necessary if the problem of diagnosis is to be visualized.

In keeping with anthropologic custom, such photographs are made of the left profile and are taken with the median plane of the head parallel to the plate or film. A frontal view may also be made where deemed necessary. As the focal distance is established through the use of a photostat beam, the image always appears in a definite ratio of life size, one fourth or one half life size being sufficiently comprehensive to answer all practical purposes. When the standard size is selected, the camera is set for this size only, that all pictures of patients may be made under the same exact conditions. The advantage of this standardized plan becomes obvious when successive pictures of patients are made and growth changes resulting with treatment are to be recorded. The nose board at the end of the photostat beam permits easy and accurate distancing of the apparatus, and, by using a suitable headrest on the photographic chair, it is practically impossible for the patient to move out of position during the exposure. The principles involved, as to both position and lighting, are shown graphically in Figure 4.

In order that such photographs may be used for the purpose of analysis, two planes of the face, as well as lineal representations of the rami and mandibular angle, must be indicated on them. In order to prepare for this, small round spots of black adhesive paper are placed on the patient's face at the measure points desired before the exposure is made, these

being the orbitale (the eye-point), the tragion (the ear point) and the gonion (mandibular angle point). Later, on the photographic print, a line is drawn from the orbitale to the tragion, indicating the Frankfort horizontal plane; and, from the orbitale, a line is drawn perpendicular to this horizontal plane, extending downward to or below the level of the chin, and indicating the orbital or frontal plane. In addition to these, a line is drawn downward from the tragion (ear point) to the gonion (mandibular angle point), and from this point a line is extended to a point on the mandible farthest toward the front and below the chin (the gnathion), indicating in an approximately accurate manner the length of the rami and the mandibular angle.

The sequence of steps essential to complete this charting are shown in Figure 5. The advantages of this method of charting facial reproductions becomes obvious when they are compared with the ordinary unrelated facial photographs. Through the use of the measuring planes in the face, and the linear representations of the component parts of the mandible,

PONT'S INDEX

If the combined mesio-distal diameters of the four upper incisors are equal to:	The distance between A to M must then be about:	The distance between G to E must be about:
25	31	39
25.5	32	39.8
26	32.5	40.9
26.5	33	41.5
27	33.5	42.5
27.5	34	42.96
28	35	44
28.5	35.5	44.5
29	36	45.3
29.5	37	46
30	37.5	46.87
30.5	38	47.6
31	39	48.4
31.5	39.5	49.2
32	40	50
32.5	40.5	50.80
33	41	51.5
33.5	42	52.3
34	43	53
34.5	43.5	53.9
35	44	54.5

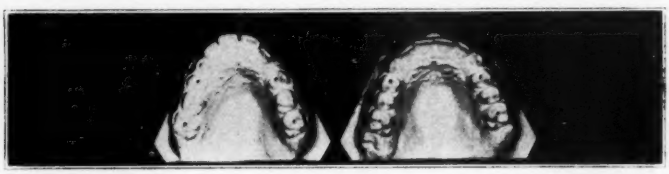


Fig. 9.—Pont's index shown in conjunction with casts of upper denture with measuring points in upper dental arch indicated. On the left, the upper denture is shown before treatment, and, on the right, after treatment measures had brought about changes to comply with Pont's index.

we not only complete the facial record in harmony with similar identifications on the denture reproductions, but also show effectively the cranial relations of the jaws. Such a record enables us to observe and study the points, lines, angles and conformation of the features and especially of the lower half of the face, often referred to as "the changeable area," and discern therein aberrations of growth having a direct bearing on our problem. Of equal importance, such facial records, when combined with gnathowritten and roentgenographic records, and with denture and facial reproductions completed, we may proceed with the task of making a diagnosis. If we attain the purpose of our quest, we must not be satisfied with mere gross generalities, but must seek to know what part or parts of the oral ensemble are abnormal, what character of deviations are manifest and the approximate degree and extent of each involvement. If diagnosis is to point the way to intelligent treatment in any given case, it must reveal the difference

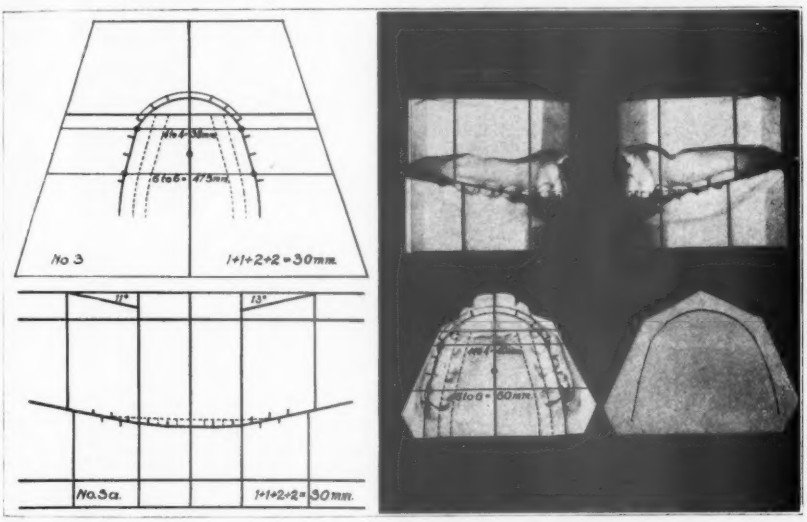


Fig. 10.—Set of gnathometric charts (left) and, right, manner in which they are used for studying abnormal manifestations in denture. The stencil outline of dental arch proportions desired is shown drawn on the top of the maxillary cast.

static casts, identify the position of the denture in the face through its relationship to the three planes already referred to; a thing most desirable if the full import of deviations from the normal are to be realized. In Figure 6, this situation is graphically shown, and, in Figure 7, the value of such records is emphasized.

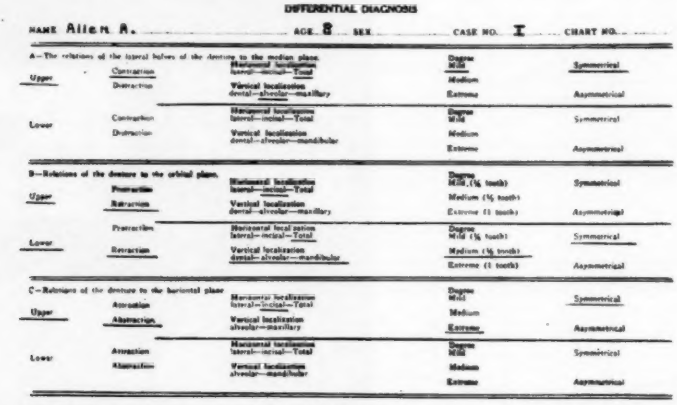
With the information available in between existing conditions and those which it is desirable to establish. "The former constitutes the anomaly, the latter, the norm."

This brings to the fore the question "What is the normal?" What standard shall influence us in determining the difference between the anomalous relationships and those to be established? We

may examine hundreds of persons who possess oral conditions within the range of the normal, and find a large number of dissimilarities among them. In other words, a variability will be apparent which will range all the way from mild to extreme differences. In computing the normal type, therefore, we are faced with the necessity of calculating the "mean" from a table of individual values, which may be accomplished by carefully considering essential similarities.

There is no escape from the use of this helpful principle of normal averages, for lizing such calculating points, the next step then consists in considering each case upon the basis of its individual typal requirements. In other words, we compare each case with the norm, based upon normal averages, just as if such a norm existed. We know that it does not exist, but is a fiction through the aid of which, by inductive reasoning, we are able to see more clearly the way toward the establishment of the normal in individual cases.

Several practitioners have raised objection to the use of a "fictional norm." The



DIFFERENTIAL DIAGNOSIS

NAME Allen A. AGE 8 SEX CASE NO. I CHART NO.

A—The relations of the lateral halves of the denture to the median plane.

Upper	Contraction	Horizontal localization lateral—incisal—Total	Degree Mild	Symmetrical
	Distraction	Vertical localization dental—alveolar—maxillary	Medium	
			Extreme	Asymmetrical
Lower	Contraction	Horizontal localization lateral—incisal—Total	Degree Mild	Symmetrical
	Distraction	Vertical localization dental—alveolar—mandibular	Medium	
			Extreme	Asymmetrical

B—Relations of the denture to the orbital plane.

Upper	Protraction	Horizontal localization lateral—incisal—Total	Degree Mild (⅛ tooth)	Symmetrical
	Retraction	Vertical localization dental—alveolar—maxillary	Medium (⅛ tooth)	
			Extreme (1 tooth)	Asymmetrical
Lower	Protraction	Horizontal localization lateral—incisal—Total	Degree Mild (⅛ tooth)	Symmetrical
	Retraction	Vertical localization dental—alveolar—mandibular	Medium (⅛ tooth)	
			Extreme (1 tooth)	Asymmetrical

C—Relations of the denture to the horizontal plane

Upper	Abrasion	Horizontal localization lateral—incisal—Total	Degree Mild	Symmetrical
	Abstraction	Vertical localization alveolar—maxillary	Medium	
			Extreme	Asymmetrical
Lower	Attrition	Horizontal localization lateral—incisal—Total	Degree Mild	Symmetrical
	Abstraction	Vertical localization alveolar—mandibular	Medium	
			Extreme	Asymmetrical

D—Facial muscles—normal in tone—deficient. Lips in function—malrelated

Fig. 11.—Diagnostic record chart showing manner in which anomalies may affect teeth, dental arches and jaws. Each condition found may be indicated by underlining the term describing it with a pen or pencil. The author has this printed on the face of an envelop 5½ by 8½ inches in size, in which are filed roentgenograms, photostatic facial records and other data pertaining to the case.

the exact ideal normal does not exist. On the other hand, anyone who attempts the correction of an oral deformity must have an end in view; i.e., the condition which it is desirable to establish, and this must be previously conceived. This end to be achieved, therefore, must first be thought of on the basis of the general, or average, characteristics applicable to the race or races from which the patient comes. Uti- same practitioners have been using other fictions, such as the constancy of the first permanent molar and the old concept of normal occlusion, and have been willing to adhere to them without question. The real justification for a fiction is its usefulness. If it serves the purpose of visualizing a problem in such a manner as to make it comprehensive and intelligible so that critical judgment may be utilized

in considering all factors involved, then it may be considered useful. By its help, we must be able to see our way through a problem, at least to the extent of having a definite objective in view toward which we shall strive.

We know that where there is an anomalous involvement, one or both of the dental arches may be too narrow or too wide. By observing, in our denture reproductions, the relationship of these anomalies to the median plane, we may immediately discern whether the condition is symmetrical or asymmetrical, unilateral or bilateral, anterior or posterior; its extent and whether the coronal portions of the teeth only are contributing, their alveolar supports are involved or the anomaly extends beyond these boundaries into the maxilla, the mandible or both, as the case may be.

We know that the denture or some of its component parts may also deviate from the normal in the anteroposterior relationships, and that such deviations may include the upper teeth or the lower teeth, or both; or that it may be limited to groups, such as the anterior teeth; or

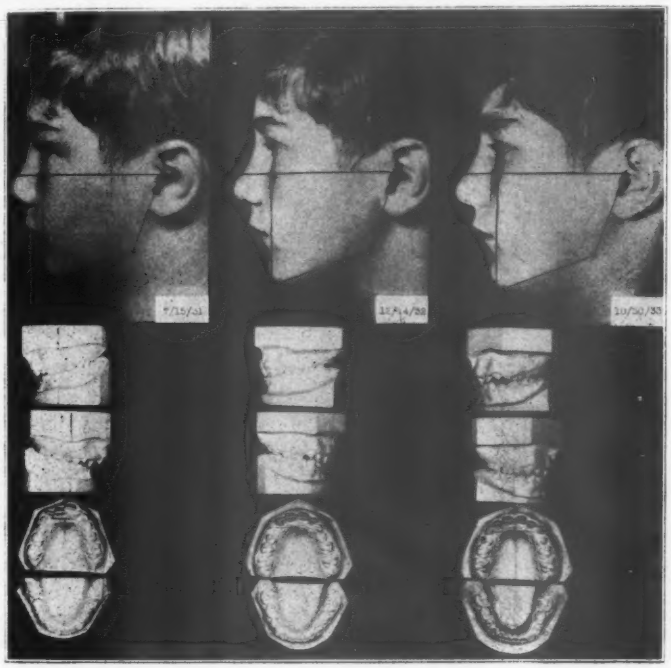


Fig. 12 (Case 1).—Case in boy aged 8. Differential diagnosis: A. Relations of lateral halves of denture to median plane: Upper alveolar contraction, symmetrical and mild in degree; lower approximately normal. B. Relations of denture to orbital plane: Upper incisal retraction; lower total dental plus mandibular retraction symmetrical and medium in degree; body of mandible showing underdevelopment. C. Relations of denture to horizontal plane: Upper incisal abstraction extreme, lower negative.

that dental and alveolar derangement may not constitute all of the involvement, but that these may extend into and include portions of the maxilla, or the mandible or both. If the mandible is involved, the rami may be affected to the greatest extent, or the horizontal portions may be equally contributing. The orbital plane offers a means of identifying these abnormalities. This intersects the denture in the region of the cuspids, and while it has always to be considered abnormal if the orbital plane fails to pass through the cuspids, although a pronounced deviation from this relationship usually indicates an anomaly. In such cases, the photostatic diagnosis will usually reveal information making possible a definite decision. It should also be apparent that, in studying the topography of the denture in its relationship with the orbital plane, and also in conjunction with the raphe median

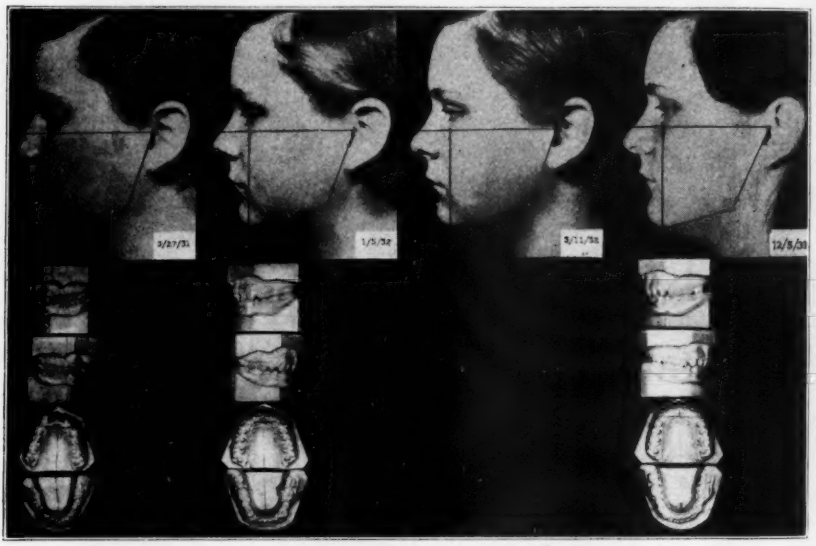


Fig. 13 (Case 2).—Case in girl, aged 12 years. Differential diagnosis: A. Relations of lateral halves of denture to median plane: Upper alveolar contraction, asymmetrical; left side affected more than right, degree mild; lower normal. B. Relations of denture to orbital plane: Upper incisal retraction; lower total dental plus alveolar retraction, medium in degree (one-half tooth); mandibular structures normal. C. Relations of denture to horizontal plane: Findings negative. D. Facial muscles normal in tone, with lips in function.

been the source of considerable controversy, due largely to a misinterpretation of its application, it serves a most useful purpose in identifying the position of the denture in the face, and in providing a starting point for judging the sagittal relations of the teeth and jaws.

Suffice it to say that a denture is not plane, the degree of symmetry or lack of symmetry immediately becomes apparent, as do other abnormalities.

In further considering the relationship of the denture in the face, we must realize that it may, in part or as a whole, deviate in its horizontal relations. In other words, it may in one, or in a variety

of combinations, be too high or too low in its position, and, in judging the possibilities of such a situation, we use the relationship it bears to the Frankfort horizontal plane. This is represented by the top of the base of the denture reproductions, and is also indicated on the facial reproductions. Variations from the normal in degree and extent; i.e., as to whether symmetrical or asymmetrical, unilateral or bilateral, and the anterior or posterior or all parts of the denture are involved, soon become apparent to the clinician adopting such means of observation and study. One factor of great diagnostic value is the ability to judge the pitch of the occlusal plane, for any sharp variation from its average degree of angularity will usually indicate an anomaly.

The average degree of angularity between the occlusal plane and the Frankfort horizontal plane will approximate 11 degrees for the right side, and 13 degrees for the left side. The fact that it is rarely the same on both sides will come as a surprise to those accustomed to judging degrees of so-called malocclusion from the old fashioned unrelated plaster casts, which are usually trimmed with meticulous care so that the occlusal plane is

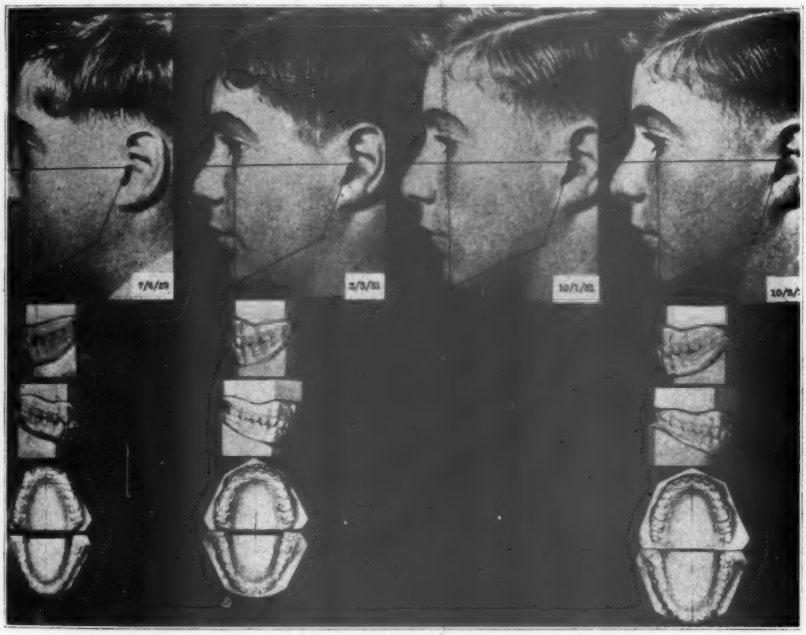


Fig. 14 (Case 3).—Case in boy, aged 14. Differential diagnosis: A. Relations of lateral halves of denture to median plane: Findings negative. B. Relations of denture to orbital plane: Upper incisal plus cuspid protraction; lower approximately normal; mandibular deficiencies apparent, especially in horizontal portion. C. Relations of denture to horizontal plane: Upper incisal abstraction marked in degree; lower approximately normal. D. Facial muscles normal in tone, with lips in function.

parallel with the base of the lower cast. While in rare instances such a situation actually exists, the establishment of this arbitrary relationship of the plane in these old fashioned denture reproductions has doubtless proved misleading in thousands of cases.

In the study of that part of the statistical data contained in the facial reproductions, certain simple rules in the appraisal of facial outlines will be helpful in noting deviations from the average norm. (Fig. 8.) For instance, we should bear in mind that the anterior curve of the chin is usually found to lie wholly in front of the orbital line. Any different relation immediately causes us to look for an abnormal involvement of the mandible, either anteroposteriorly or with manifestations of arrest of development in the bone itself. The gnathion, which is the measuring point here, in the well-developed face, usually lies in the immediate vicinity of the orbital plane. The mentolabial sulcus is more or less receding, and the course of the orbital fissure is usually at right angles to the orbital line, while the curve of the upper lip is slightly concave. The Frankfort horizontal plane passes through the middle of the dorsum of the nose, so that if we draw lines parallel to it, causing one to

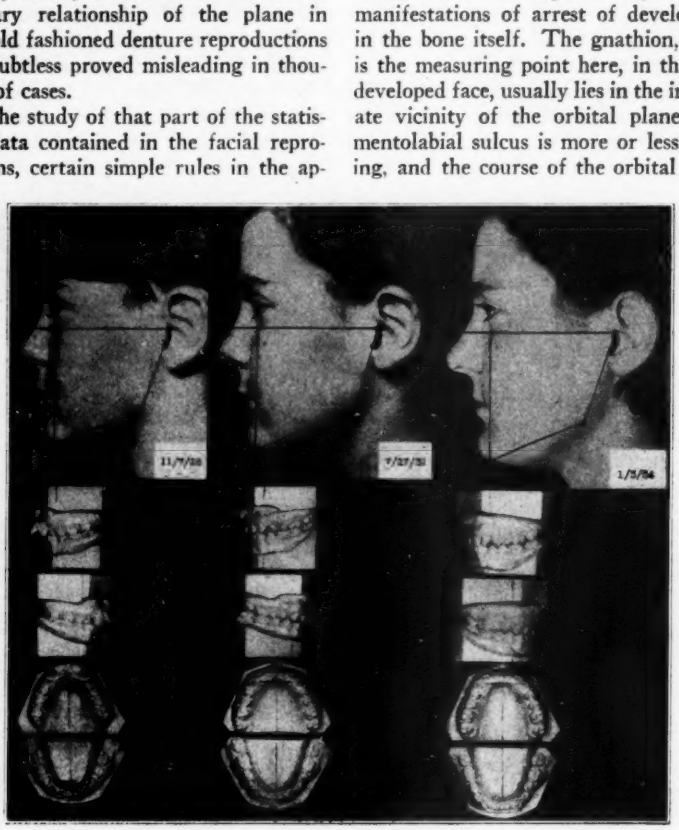


Fig. 15 (Case 4).—Case in girl, aged 8. Differential diagnosis: A. Relations of lateral halves of denture to median plane: Bimaxillary alveolar contraction, mild in degree. B. Relations of denture to orbital plane: Upper incisal protraction; lower total dental plus mandibular retraction, medium; mandible normal. C. Relations of denture to horizontal plane: Findings negative. D. Facial muscles normal in tone, with lips in function.

pass through the root of the nose, another through the subnasion and still another through the gnathion, we find that the perpendicular distance between these lines will not vary to any great extent.

Any departure from this relationship should lead us to look for some morphologic deviation and seek to determine the various structures involved in it. Helpful appraisal of the proportionate length between the body and the ramus of the mandible may be achieved by studying the lines drawn from the gnathion to the gonion, and from the gonion to the tragion. In the photostatic projection, these should approximate each other in length (in actual anatomic measurement, this, of course, would not be true). Through utilizing the angles formed by these lines, favorable or unfavorable developmental tendencies may be judged. The mandibular angle will vary from 130 to 140 degrees, and while it cannot be counted on as remaining fixed, for practical diagnosis 140 degrees may be considered the "mean" in well-developed faces between the ages of 8 and 12 years. As the majority of patients seek care be-

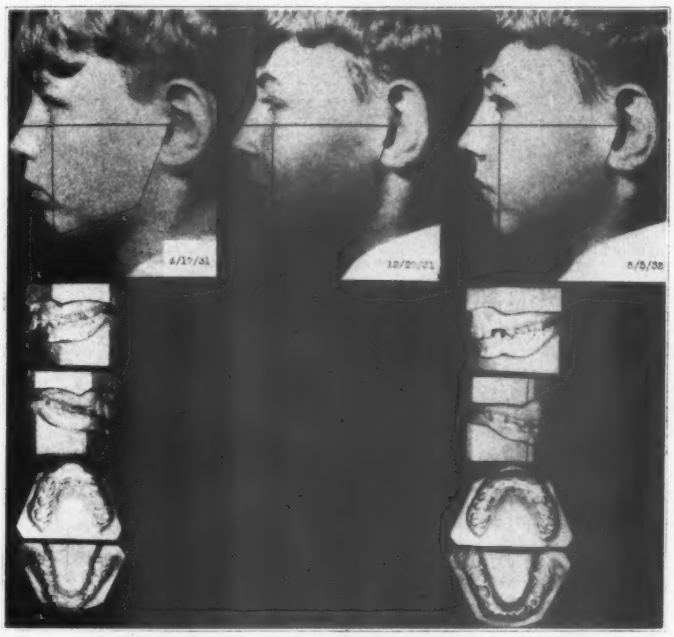


Fig. 16 (Case 5).—Case in boy, aged 9. Differential diagnosis: A. Relations of lateral halves of denture to median plane: Bimaxillary alveolar contraction, medium in degree, asymmetrical, right side affected more than left. B. Relations of denture to orbital plane: Upper incisal protraction; lower total dental plus mandibular retraction, medium; arrestment of growth especially apparent in anterior portion of mandible. C. Relations of denture to horizontal plane: Findings negative. D. Facial muscles extremely deficient in tone, but lips in function.

tween these years, this may be used as representing the norm.

If desired, all these various anomalies may be recorded on a suitable record chart (Fig. 11), this being so compiled that each condition found may be indicated by merely underlining the descriptive term with a red pencil. If it is desired to carry measurements out in the minutest detail, "graphs" or curved diagrams of the denture reproductions may be made, representing transversal sections through the palate, or similar drawings representing the median plane, and likewise those indicating the occlusal curve of the opposing teeth, showing their vertical relations from molar to molar. While such methods will reveal much of value in compiling statistical data, they are not considered essential for practical purposes of diagnosis. The most important part of the recorded material is included in the

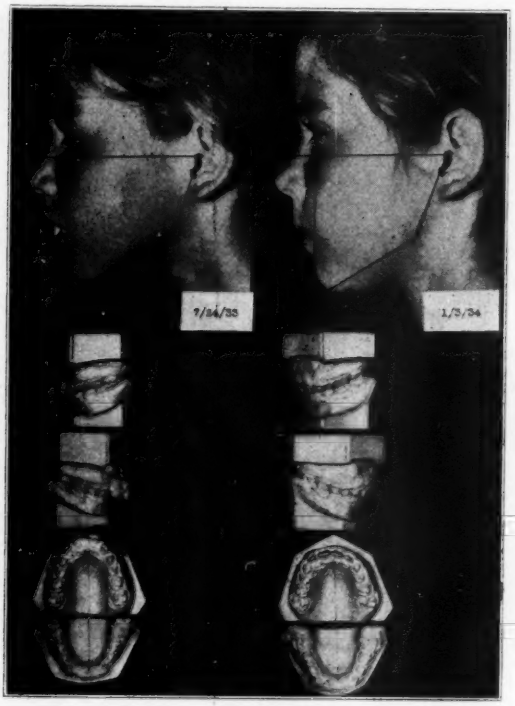


Fig. 17 (Case 6).—Case in girl, aged 9. Differential diagnosis: A. Relations of lateral halves of denture to median plane: Upper alveolar contraction, symmetrical and mild in degree; lower normal. B. Relations of denture to orbital plane: Upper incisal protraction extreme; lower total dental plus mandibular retraction; dental condition medium in degree; mandibular condition extreme with marked deficiency in length of rami. C. Relations of denture to horizontal plane: Upper incisal abstraction; bimaxillary posterior attraction; rami and marked arrestment of development apparent. D. Deficient in tone with lips malrelated.

written and roentgenographic records and in the denture and facial reproductions. These reflect the anomalous conditions. By comparing these with known conditions contained in the table of normal averages, and with what clinical experience has taught us relative to the normal, the difference becomes immediately apparent.

Reference has been made to tables of normal averages, and their usefulness in judging deviations from the normal. These should include information pertaining to dental arch proportions, the degree of angularity of the occlusal plane, the relation of the various parts of the denture to their dependent facial structures and other material which will aid in revealing the difference betwen the normal and the abnormal. One very helpful agency in this connection is available in the use of Pont's index in predetermining desirable dental arches. The key is gained by measuring the combined mesiodistal diameters of the four upper incisors, and, from this, the distance which should obtain between the first bicuspids to accommodate the anterior teeth is revealed, as well as the width which should prevail between the first permanent molars in completing desirable dental arch proportions. This index is shown in Figure 9. Deviations in arch width, according to this standard, are measured on the dental reproductions with orthodontic calipers, the measuring points being the mesial grooves of the upper first bicuspids and the central fossae of the upper first molars and their corresponding occlusal points on the lower teeth. I have utilized these average measurements in developing a set of transparent gnathometric charts, which, in addition to being superimposed over the dental arches for the purpose of study, can also be used as a stencil and the dental arch proportions desired drawn on the top of the denture reproductions, thereby recording the approximate line of occlusion of both the upper and the lower teeth. The plan is illustrated in Figure 10.

In presenting a series of cases for critical study, it will be my object to show not only the important evidence upon which diagnosis was based, but also some interesting sequelae of treatment efforts. All requisites to diagnosis connected with these cases will not be given, for time and space do not allow their inclusion at this time. The written and roentgenographic records, therefore, have not been included in the illustrations. Certain facts relating to them will doubtless be mentioned from time to time, as, of course, each case presented was adequately recorded by such means, in addition to denture and facial reproductions which will be shown.

No attempt will be made to discuss treatment technic, for this paper is concerned only with orthodontic diagnosis. The nomenclature used will be that suggested by Professor Simon. If this proves unacceptable, suggestions for its improvement will be in order. The cases selected are typical of those which any orthodontist meets from day to day in his practice. In addition to this fact, most of those to be shown have been recorded over a sufficient period of years to prove not only interesting, but also of a nature to make us realize the real function and possibilities of those who take the orthodontic problem seriously.

In considering the character and extent of anomalies present in the cases under scrutiny, we shall approach each in a similar manner, subjecting all essential dependent parts to analysis. This method is necessary if we are to discern more than mere gross abnormalities. Furthermore, such a plan is helpful in establishing routine habits; which, in the end, broadens the concept of the field and increases diagnostic acumen. To this end, all illustrations have been prepared in a

similar manner, showing the facial reproductions and their accompanying denture reproductions in such a relationship that their interdependent status is easily made apparent. Furthermore, these have all been photographed in exactly one-half actual size, thereby rendering dependent relationships less confusing than where a differing proportionate size is used between the two. In carrying out this appraisal in each case, the denture will first be considered and then the face, although the interdependence of the two merge in so many instances that to separate them is difficult except where the denture only is affected. Even so, this information is essential to diagnostic decisions.[3]

A. We know that in the varied anomalies affecting the denture, the sides of the upper or the lower, or both, may be too near the median plane (contraction) or too far from it (distraction) that, in horizontal location, the sides (lateral) or frontal (incisal) portions, or both (total), may be affected; that in vertical location, the teeth (dental) or these plus their immediate bone supports (alveolar) may contribute, or the anomaly may extend into the maxilla, in the case of the upper (maxillary) or into the mandible or both; that the condition may be symmetrical or asymmetrical, and may vary in degree, being mild, medium or extreme.

B. We know that in considering the relationship of the upper and lower dentures to each other and to the orbital plane, we may find the upper or the lower teeth, or both, too far forward (protraction) or too far back (retraction); that in horizontal location the sides (lateral) or frontal (incisal) portions or both (total) may be affected. In vertical location, the anomaly may include the teeth (dental) or these plus their alveolar bone (alveolar) or may extend into and include the maxilla, in the case of the upper (maxillary), or into the mandible or both; that the condition may be symmetrical or asymmetrical, and vary in degree, being mild, (one-fourth tooth) medium, (one-half tooth) (equal to the width of one bicuspid) or extreme (one tooth).

C. We know that in its relation in facial space and to the Frankfort horizontal plane, we may find the upper or lower denture, or both, or parts of each, too high up (attraction) or too low down (abstraction); that in horizontal location, the sides (lateral) or frontal (incisal) portions or both (total) may be affected; that in vertical location, the teeth plus their alveolar bone (alveolar) may be involved or the anomaly may extend into the maxilla, in the case of the upper (maxillary) or into the mandible or both; that it may be symmetrical or asymmetrical, and vary in degree, being mild, medium or extreme.

D. In addition to this formula for differential appraisal, we will add the status of the oral and facial muscles, noting whether they are normal or deficient in tone; also whether the lips are in function or are malrelated.

A chart completely outlining these possible anomalous involvements is shown in Figure 11. The underlined descriptive terms shown on it give the differential diagnosis of the case shown in Figure 12. It will be realized that all cases examined are not affected in equal degree and, therefore, in describing them for study, only such deficiencies as seem definitely possessed by them will be mentioned.

In studying the illustrations accompanying case reports,[4] attention is called to the fact that, in each instance, the se-

3. McCoy, J. D.: Applied Orthodontia, Ed. 3, Philadelphia: Lea and Febiger, 1931.

4. Twenty-one case reports were presented with the paper. Because of space limitations, only six are included for publication.

ries on the extreme left represents the denture and facial records used for diagnostic purposes. Any other recordings shown merely represent changes induced by treatment. These are important in that they show the justification of diagnostic decisions.

These methods have added one more link to the chain which has heretofore been missing, i.e., we are now able to determine with a reasonable degree of accuracy what we do to our cases when we treat them. If we disregard all the other helpful features which are available in gnathostatics, this one alone would be sufficient to place us under lasting obligation to Dr. Simon. In our past clinical reports, we have made many extravagant statements upon purely ocular evidence. We thought that we had accomplished certain things, but we had no means of making dependable measurements. Now, when we adopt a plan of treatment, we can tell how nearly we achieve our aims. Even granting that errors will creep in during the application of the measuring principles, a novice can see the vast improvement over our older methods. During the next few years, a great deal of valuable evidence is bound to be accumulated which will not only have its effect on treatment, but also will shed a much-needed light on prognosis.

Every orthodontist of experience realizes that sound judgment is essential to all phases of successful practice, whether it be diagnosis, the evaluation of etiologic factors or treatment. It should be obvious, nevertheless, that any plan which makes it possible to see an anomaly correctly, to judge its extent and to determine with a fair degree of accuracy which structures are affected, and the approximate extent of their involvement, places him in a better position to make an intelligent diagnosis.

THE STORY OF THE ORIGIN AND DEVELOPMENT OF PERIODONTOCLASIA*

By THOMAS B. HARTZELL, M.D., D.M.D., Minneapolis, Minn.

I ENTERED the University of Minnesota College of Dentistry in 1890, and graduated in 1893, and I have no recollection whatever of any instruction being given in the treatment of what we now call paradentosis, west of the Rocky Mountains, periodontoclasia, east of the Rocky Mountains, and what, prior to the formation of the society devoted to the study of the science of the destruction of the tissues around the teeth, was called pyorrhea alveolaris, and before that time, Riggs' disease.

The literature of dentistry is replete with articles devoted to a discussion of this condition. The great variety of remedies prescribed for it is a sure proof that people never have agreed as to its etiology. It is my belief that, in the United States, distinct attention was first centered on this disease by J. M. Riggs. Dr. Riggs was a member of the Connecticut Valley Dental Association.

The Connecticut Valley Dental Association was organized in 1863, by a few dentists of Western New England, feeling the

*Read before the Section on Periodontia at the Seventy-Sixth Annual Session of the American Dental Association, St. Paul, Minn., Aug. 9, 1934.

need of associated efforts for the promotion and interests of Dental Science, who assembled at the Massoit House in Springfield, Massachusetts, the evening of the 10th day of November, 1863, to consult together, and it was thought best to organize a society.

The foregoing is a quotation from the first entry in the records of the Connecticut Valley Dental Association.

The meeting was called to order by Dr. F. Searle, who was chosen temporary chairman, and Dr. L. D. Shephard was chosen temporary secretary. Remarks favorable to the formation of such a society were made by gentlemen representing Vermont, Massachusetts and Connecticut. As a result it was decided to form an association to be called the Connecticut Valley Association of Dental Surgeons. Dr. Shephard presented a draft of a constitution and by-laws, which was taken up article by article, discussed and amended, and adopted. All present then signed the roll and paid the initiation fee, and thus became members. The organization was completed by the election of the following as officers: President, Dr. F. Searle; Vice Presidents, Dr. O. R. Post and Dr. C. Stratton; Secretary, Dr. L. D. Shephard; Treasurers, Dr. H. N. Miller and Dr. E. V. N. Hartwood; Executive Committee, Dr. C. S. Hurbut and Dr. A. A. Howland.

Dr. Riggs was not in the original group who organized this association, but came in, I believe, Oct. 31, 1865, at the Springfield meeting. It is interesting to note that the committee who recommended Dr. Riggs for membership in the Connecticut Valley Dental Association were Dr. Jones, Dr. Derby and Dr. Miller. They also recommended J. N. Tourtellotte and C. W. Estabrook, of Worcester, Mass., E. D. Rice and W. W. Rice, of Great Barrington, Mass., J. M. Riggs, of Hartford, Conn., and J. J. Anderson, of Springfield, Mass. The minutes of the association show that Dr. Riggs had attended at least one or possibly two meetings prior to the time that he was elected to membership, Oct. 31, 1865, because the minutes prove that he took part in certain discussions.

On June 10, 1869, the Connecticut Valley Dental Association met in Greenfield, Massachusetts, and a very considerable program was contributed by the membership. Professor Hitchcock read an able and interesting paper on Salivary Calculus. He considered in detail its various phases and its effect on tooth substance and the alveoli and the gum tissues; also the mode of treatment in removing it, and in restoring the gums to a state of health. Dr. Riggs followed Professor Hitchcock, stating that for twenty-five years past he had treated this condition of disease in the alveolar process and gums with marked success, and referred to the clinic held by him in North Hampton two years previous when he operated on the teeth and gums of Dr. Goodrich. The case presented at the time was an almost hopeless appearance; and, today, we have the patient with us; and the case is a radical cure. He referred to several other cases occurring since then where success had attended his operation, with instruments of the right shape and temper, and the operation performed in the manner he had already described at several of the meetings and demonstrated at the clinic referred to, one could be sure of effecting perfect cures in a majority of cases. Dr. Leach detailed his mode of operating and exhibited some of the delicate and perfectly shaped instruments for removing any accumulations on the roots of teeth. Dr. Riggs advised a thorough operation at the first sitting and that each tooth portion or whole jaw operated on be finished at that time. Dr. Leach preferred several sittings at an interval of a week or ten days; he considered that in this way he makes the operation less severe for the patient, and that he can better determine, if it is needed. Dr. Riggs stated that in his opinion the course pursued by Dr. Leach made the operation a very much more painful one for the patient, as after a portion of the tartar had been removed,

there was an effort on the part of nature to set up a healthy action, and as a consequence the parts would be much more sensitive to an operation; while they were in a diseased state, they were not as acutely sensitive, and therefore the patient can bear more. He instanced an amputation; no surgeon would be justified in making an incision and then waiting a few days before completing the operation. The treatment of the gums is a surgical operation and should be performed as such.

The foregoing is a direct quotation from the minutes of the meeting of the Connecticut Valley Dental Association, June 10, 1869. It appears that Dr. Riggs had been demonstrating his method of treating periodontoclasia for several years prior to this occasion, and that his work had seemed to him to be a considerable success. There is no question in the mind of a reader of the proceedings of this Connecticut Valley Dental Association that Dr. Riggs was an outstanding exponent of many of the methods in use today in the treatment of gum and alveolar process disease. One of the principal evidences of the fact that he was a pioneer in this field is the fact that many men of the Northwestern New England States adopted the name of "Riggs' disease" to designate the condition. The fact that he had given a clinic before the association two years prior on the teeth and gums of Dr. Goodrich, and he states in this discussion, as I have just quoted, that he has been following methods of the kind advocated here and used by him on Dr. Goodrich shows that, prior to this particular meeting, he had been following these methods for twenty-five years, i.e., he had been paying particular attention to this disease as early as 1844. Dr. Goodrich offered the following resolution at the same meeting, the second day, which was June 11, 1869:

WHEREAS, the credit for originality in surgery is always conceded to the one who first publicly announces a new operation, appliance or method;

Resolved, that in the judgment of the Connecticut Valley Dental Association, the credit of originating and first publicly describing a new treatment for the cure of inflammation of the gums and absorption of the alveolar process, or the so-called "scurvy of the gums," thereby saving and restoring to comparative firmness, the loosened teeth, is due to Dr. J. M. Riggs of Hartford, Connecticut; he having first detailed his method of operating to this society years ago, and illustrated it at the request of the society by a clinic upon Dr. E. M. Goodrich of Westfield, Massachusetts, at our meeting at North Hampton, in June, 1867; he also operated in August, in 1866, with acknowledged success, upon Dr. D. K. Hitchcock;

Resolved that this resolution be forwarded to the Journal for publication.

A footnote at the bottom of page 52 of the *Transactions of the Connecticut Valley Dental Association* draws attention to the fact that the *Dental Cosmos,* of 1869, pages 410 and 414, published the foregoing resolution. I find, on consulting the *Dental Cosmos,* that the resolution was evidently adopted, for the Association then adjourned, to meet in Springfield, Mass., October 21 and 22 of the same year.

Riggs' treatment of periodontoclasia seems to have been purely of a mechanical nature. No reference is made by him to bacteria as a possible cause of it, notwithstanding the investigations of Louis Pasteur (1822-1895) had begun to revolutionize the practice of surgery in the hands of Joseph Lister as early as 1867, when he demonstrated that all fermentation was due to specific bacteria. This discovery was made in a study of the difficulties of the wine and beer makers of France. Certain it is in my mind that if the dental profession of the world would utilize the principles demonstrated by Pasteur and Duclaux and accept the

fact that periodontoclasia or pyorrhea alveolaris is purely and simply a germ ferment disease and that the destruction of the periodontal membrane and the bone surrounding it and the tissues surrounding the bone is due to the action of pus-making bacterial ferment, enormous progress would be made, and dentistry as a learned profession would have received a practical uplift in value and in the minds of the medical profession, who have viewed our operations largely as mechanical.

It is entirely possible to teach patients to take measures that will rid their teeth of so many of these pus-forming bacteria from day to day that there will not be a sufficient number of them left to produce enough of the ferment to destroy tissue. We can never expect to eliminate bacteria entirely from the human mouth, but we can reduce the amount of growth in the human mouth and particularly on teeth and in the tissues about teeth to a minimum, so that little or no harm can result from their presence; for it is easy to neutralize their ferment, even though we cannot prevent their growth. Let us unite our energy and work toward this end, that we too may profit by a more accurate application of scientific principles in the care of this disease. We will not be raising ourselves by our bootstraps, but, on the contrary, will be improving the health of a great nation. Just as the fact that bacteria growing in dental abscesses about the root ends of teeth have been a source of more than one third of the heart, joint and kidney diseases of the world was demonstrated successfully by the research work which I instituted and which was carried on by Henrici and Bell at the University of Minnesota in the years 1912-1914, so will the people of this country, and the dental profession of this country, gain in the control of destructive microbes growing on the surfaces of teeth if they will only believe and apply that belief to the reduction of the growth of bacteria on the sides of teeth, thereby reducing the amount of ferment.

If the dentists composing the Connecticut Valley Dental Association had realized the value of Pasteur's discovery, as did Lister, the dental profession would be more truly a deserving member of the great guild of medicine, marching shoulder to shoulder with Lister. There is no particular excuse for the dental profession's not having taken advantage of Pasteur's discoveries as Lister did, except that no man in the dental profession noted these discoveries. The medical profession must for all time be deeply grateful to Lister, who seized on the fact demonstrated by Pasteur that there is a specific ferment for every type of fermentation. He believed it and applied it at once to the prevention of ferments entering into exposed wounds. And now the surgery of the world stands firmly on that foundation, and the progress that surgery is making and has made stands on that fact alone. It is just as impossible to grow wheat without wheat seed, or corn without planting corn, as to have pyorrhea alveolaris without planting in the tissues surrounding the teeth staphylococci and streptococci.

Pasteur also saved the cattle of France from anthrax. The deadly disease was rampant in that country. An appeal was made to Pasteur and he was able, through his knowledge of chemistry and bacteriology, to demonstrate that anthrax was due to a specific organism. He also found out how to attenuate this organism so that he could produce immunity to the disease in cattle. Pasteur's discovery set the science of bacteriology firmly on its feet, and we now believe that most of the disease of great moment will eventually be controlled through the further applica-

tion of the principles discovered and given to the world by Pasteur.

Dentistry, as a whole, has taken almost no advantage of this science in the treatment of periodontoclasia, though one by one the great death dealing diseases are being conquered by it. Yellow fever and bubonic plague are examples of accomplishment. If medicine had been unwilling to adopt the principles of Pasteur, yellow fever would still be rampant, the Panama Canal would not have been dug and bubonic plague would be endemic in all our great port cities. In 1912-1914, I definitely proved that the dental abscess was due to the invasion of the tissues around the ends of tooth roots by bacteria growing on and in teeth, and that metastasis from these areas caused one-third of the heart, joint and kidney disease in this country. Application of the knowledge thus gained has lessend the amount of heart, joint and kidney disease in all patients who are cared for by competent dentists who believe and apply these facts. The same bacteria also grow in enormous quantities on the sides of teeth, and if we paid as much attention to the elimination or prevention of the growth of these bacteria on teeth as we should, the science of periodontology would be placed upon the same sound footing as was general surgery as a result of Pasteur's work. Within the last two years, I have listened to two excellent papers by dentists dealing with the causes of periodontoclasia. Each one of these papers recited thirty or more causes of periodontoclasia. Bacteria were mentioned casually, only too casually, and ferments not at all, and it is my belief that the majority of the dentists of the country think that bacteria and their ferments are purely incidental to the disease; whereas, they are fundamental to it, and if the same effort was put into limiting these bacteria growing on the sides and roots of teeth as in the root canals of the teeth, enormous progress would be made in every instance. Just why the dental profession has been so casual in regard to the principal source of periodontoclasia, I am unable to understand. Certain it is that if the individual who has a beginning periodontoclasia were taught to remove the daily growth of streptococci and staphylococci from the sides of the teeth and the gums surrounding the teeth, strengthening them by exercise, the prevention of this disease would be accomplished.

The dental profession as a whole stands today exactly where it stood when John M. Riggs put "Riggs' disease" on the map. Perhaps this stagnant position of dentistry in the application of present bacterial knowledge has been due to the fact that no man has done for bacteriology in this field what Duclaux, the most outstanding pupil that Pasteur ever had, did for the progress of Pasteur's discoveries. Duclaux was born in 1840 and was educated by his father, who worshipped his first born and guided his education with a vigor that developed his fine mind. He, too, specialized in chemistry, and, in October, 1865, left Paris for Tours, where he had been appointed professor of chemistry in the secondary school. He was now the youngest professor in the faculty of France, being only 26. From Tours, he was soon transferred to a better place at Clermont-Ferrand, where a portion of his time could be given to Pasteur's work. Pasteur, at that time, worked in very cramped quarters, but Duclaux greatly prized his opportunity to work under the great master, and to him, we owe, perhaps, the best story of the life of Pasteur thus far written, the title of which is "Pasteur, The History of a Mind." Duclaux was a member of the Institute of France, professor at the Sorbonne and

director of the Pasteur Institute, which he became when Pasteur died. English-speaking people owe a debt of gratitude to Erwin F. Smith and Florence Hedges, pathologists of the United States Department of Agriculture, who translated Duclaux's life of Pasteur. If every dentist and every physician were to read this book, an enthusiasm would be revitalized or initiated that would be a tremendous stimulant to those who practice the healing art.

In regard to the progress that the dental profession is making, I feel as Duclaux felt when, in 1882, he wrote *Ferments et Maladies,* which he dedicated to his wife, who died of puerperal fever. The dedication reads as follows:

> To you, innocent victim of the infinitely little, I dedicate this book, in which I have attempted to popularize their history. May it, slight as it is, serve to hasten a little a day wherein the accomplishment of her sacred mission will no longer cause the wife to fail her husband and the mother the newborn child.

This book made such a sensation that a gold medal was given for it by the Society of Agriculture. Also a number of medical men were won over to a belief in microbes. In 1882, apropos of *Ferments et Maladies,* which had just appeared, he wrote to his friend, M. Voight:

> You are very amiable to say so many good things about my book; but physicians are those I would wish to lay hold of, and I begin to believe I shall not succeed. I know very well that old physicians do not read any more, and when they read they do not understand. I know that students think only of their examinations, *when they think at all;* but among the population of hospital internes or externes or that of physicians who have not yet obtained a clientele, I thought I should find attentive readers possessed of goodwill. Experience begins to demonstrate that I shall not have them.

Again he writes: "When I read one of those Byzantine discussions of the Academy of Medicine, always I ask myself, whether the *speakers do not wish to understand* or simply cannot understand."

From 1877 to 1896, Smith and Hedges, from whose translation I am copiously quoting, tell us that Duclaux's time was largely devoted to a profound study of milk and dairy products. These led him to attribute to microbes a preponderant rôle in disease in all the industries based upon milk, and led to a revolution, to a great extension of these industries, owing to the better keeping qualities of properly made cheeses. The work of Duclaux inaugurated the scientific era in the dairy industry. In recognition of these researches, the Agricultural Society awarded him its great gold medal in 1881. Duclaux was also the first to gather together and coordinate the scattered facts on enzymes. He also devoted much time to the study of the purity of the water supply and to analyzing especially the water of springs issuing from the volcanic lands of France.

The Pasteur Institute was founded in 1888, with a considerable corps of workers, and Duclaux was selected to formulate and disseminate the doctrines or facts growing out of the work of the scientists in the Pasteur Institute. Pasteur, himself, was an individualist, working alone. Duclaux, on the contrary, wished to establish a great college of international biology. He wished to open the doors to the faithful from all corners of the earth, and to work in a large way to found a scientific college for the future, where each one would be free while laboring in a common cause. And while the world owes to Pasteur the credit for the imagination and labor that set bacteriology on a firm foundation, it certainly owes to his student, Duclaux, the enormous benefit that came as a result of the spreading of this knowledge in the scientific world.

I hope that I may be pardoned for this

brief interlude in the story of my recollections of the growth of periodontology, as it serves to point a moral to adorn a tale. Ever so often, a member of the dental profession has seized on the fact that periodontoclasia is much benefited by skilful root cleansing, as did Younger, and attains some recognition because of the fact that he apparently makes cures just as did Riggs. Nevertheless, the outstanding fact remains that, in the course of a few years, these patients relapse into the same state in which they were found by these enthusiastic operators. This unfortunate fact is due to one thing only: the nonrecognition of the bacterial ferment nature of the disease, and the failure of the operator to teach this fact to the patient, and to train him in the art of removing, from day to day, the growth which occurs in the interval between night and morning. It takes about 26,000 streptococci or staphylococci laid in a row to make an inch. They are infinitely small. We cannot taste or feel them, nor see them without the aid of instruments. A streptococcus or a staphylococcus attains its full size and activity in an instant of time. Watched under the microscope, it is seen to subdivide every thirty-five minutes and become two. The germ does not wear out and grow old, but merely recreates itself in the form of two instead of one, and two produce twice as much ferment as one. The increase in the numbers of these germs in the mouth during the resting period of night is beyond computation. Dentists have been trying to attribute the progress of pyorrhea to a variety of physical conditions, and have ignored the essential one. It is true that people who are in ill health and who have never been taught an effective method of removing the daily growth of bacteria from their teeth are more subject to the ravages of pyorrhea than are others. It is also true that physical injury of the teeth in their sockets enhances the possibility of increasing the number of bacteria growing on the sides of teeth. Therefore, traumatic occlusion is frequently spoken of as a cause of pyorrhea, when, as a matter of fact, if no bacteria were present, traumatic occlusion would never cause pyorrhea. But injury increases the possibility of invasion of the tissues surrounding the teeth from the bacteria growing on the sides of teeth. Nevertheless, it is foolish to ignore bacteria as the principal and only cause of pus formation through the action of their ferments. Traumatic occlusion, or malocclusion, or any other form of irritation will not induce pyorrhea. It may lay the foundation for it by making the circulation less perfect, and, therefore, resistance to the invasion of pus forming bacteria easier for the invading germ. I have read reams of material on the control of tooth decay by diet, but I have never, in my forty years of experience with this disease, been able by any prescribed form of diet to limit or cure a pyorrheal inflammation. I do find it is true that people who live on diets that are largely fruits, particularly citrus fruits, and leafy top vegetables, with a minimum of heavy foods, suffer less from invasion than do those who live on extremely heavy foods. Here, the value ends, because people who live on fruit and vegetable diets suffer from pyorrhea also. So, once and for all, let us put out of our minds the idea of curing people of pyorrheic disease by dietary measures only. Let us devote our energies to overcoming the growth on the teeth by cleansing and removal from the teeth themselves, of the daily growth of pus germs, and to detoxifying or neutralizing their toxins and ferments. The last great step in controlling the action of bacterial ferments was made by Larson of Minnesota in 1919, when he discovered a

substance which detoxifies or neutralizes all known bacterial ferments except one. Curiously enough, the Council on Chemistry and Therapeutics has forbidden publication of this fact.

In Boston, fifteen or twenty years ago, L. D. Shephard, mentioned in the early pages of this article, presented me with two instruments made by John M. Riggs for the treatment of pyorrhea. The beauty of the construction of these instruments leads me to say that there has not been a great amount of improvement in the instrumentation of root surfaces from Riggs' time until now. Therefore, no great progress has been made in the treatment of pyorrhea by mechanical means. It is true that the methods followed today by the members of the academy lead to brilliant and beneficial changes, just as they did in Riggs' time. But this Section and the academy, as a body, might well adopt a much more vigorous attitude in regard to the primary and initial cause of the disease.

A step forward in the treatment of the disease was suggested by Henry Barnes of Cleveland, who first advocated and taught interdental brushing. M. L. Fletcher, of Cincinnati, recognized the fact that where deep pockets existed, recreation of mucous membrane to line the sores that were deeply pocketed did not occur. He therefore resorted to the cutting away of a v-shaped wedge of tissue from such pockets, and roughening of the bony surface by the bur, in the belief that the bone itself might also be diseased. This was a distinct step forward, because it is a fact that mucous membrane, no matter how the roots may be cleaned of deposits and bacterial masses, will not penetrate into the deep pockets caused by the solution of peridental membrane and bone by bacterial ferments and thus the bottom of these pockets does not regain a healthy epithelium, but remains a bleeding surface. Therefore, the removal of a flap or opening of these pockets, so that it becomes possible for mucous membrane to heal the sores, after proper root cleansing has been done, was and is a distinct step forward.

It has always given me pleasure to study the work of the men who have contributed the initial steps in every great improvement in science. Because of this fact, I have taken delight in recalling and acknowledging my indebtedness to Riggs, Shephard, Fletcher and Henry M. Barnes, whom I have just mentioned. Periodontists ought to be especially grateful to Dr. Barnes because, before there was a society of periodontology, he was teaching interdental tooth cleansing with toothbrushes. My first recollection of his demonstration was at Putt-in-Bay at a meeting of the Ohio State Dental Association many years ago, and, following the suggestions and demonstration that he there gave, I at once adopted the method, and I have continued to use it through the years. I have always regretted that I did not at some time in my earlier work in periodontology acknowledge this debt to Dr. Barnes, for it marked a distinct step forward in the care of teeth. Prior to that time, the use of the toothbrush was certainly not so effective as it is today. We also owe a debt of gratitude to D. D. Smith, of Philadelphia, who was one of the pioneers in preventive dentistry. The Minnesota State Dental Association invited him to read a paper many years ago, and it was a most instructive and enjoyable contribution to those of us who were keenly interested in prevention. Then came our eminent member Dr. Fones, from the east coast, who certainly gave a great impulse to better care of the teeth, not only by his own work and his method of cleaning and of teaching his patients to clean the surfaces of teeth of bacterial

life, but also by the establishment of a school to teach others to profit by his experience. Notwithstanding these steps forward in this science, many of us were discouraged with the final results of the treatment of so-called pyorrhea. Skilful instrumentation produced very beautiful temporary results. But invariably, in the course of time, these results were lost, particularly in those cases in which deep pockets have been created in areas that were difficult to reach with the then known and practiced methods of cleaning teeth. As far as I know, M. L. Fletcher of Cincinnati gave us a step upward when he taught and advocated cutting away portions of tissue which would not heal, and the bur curettage or light scraping of the bone around teeth in which pyorrhea pockets existed. Fletcher's work did not gain the wide recognition that it deserved. Nonetheless, I entertain a feeling of gratitude to him for the suggestions received from him. Several years later, at a meeting held in Chicago, two excellent papers on tooth cleaning and prevention of decay were contributed in the same week, one by Dr. Morton, of Milwaukee, another by Dr. Charters, of Des Moines. Both papers were excellent. The paper by Dr. Morton was not given such wide publicity as that of Dr. Charters. At any rate, many people now speak of the Charters method of brushing or cleaning teeth, and none of us will, I believe, deny him respect for his energy and courage. In fact, it is a pity that a great many more men who actually know do not spend more time extending their knowledge to others who might well profit by it. Much greater success would have come to those who have attempted to follow conservative methods in the treatment of the pyorrheal process had they had Dr. Fletcher's method of removing tissue which was pocketed so deeply that epithelium could not enter the pocket and line it to the bottom, thus promoting healing, and it is a matter of regret that this improvement was not more widely published. Then too, when tissue is cut away from the sides of teeth, the roots are left unprotected and sensitive. We were compelled to use cement, which was more or less irritating, to cover these sensitive surfaces. Many different substances have been suggested for this type of protection, one of which, devised by A. W. Ward, and containing zinc oxide, tannic acid and enough ground asbestos to assure protection against thermal change, I have used with great satisfaction.

The battle between life and death is a continued fight against micro-organisms and their products. It is not unlikely that we will eventually conquer all disease through a more thorough knowledge of the effects of bacterial enzymes and toxins, and it seems quite likely that the science of bacteriology, of all the sciences pertaining to medicine, is one of the most important.

To those of you who have any doubt whatever of the power of bacteria to penetrate tissue, I suggest that you obtain an article written for the Buffalo meeting held in New York in May, 1927.[1] In this particular article, I show a tooth root covered with bacterial masses thousands of layers deep and also sections of gum tissue, demonstrating streptococci and staphylococci and fusiform bacilli in the tissues cut away from the surface of teeth that had been dissolved from the cementum by the solvent action of bacterial ferments. The painstaking pictures made of sections of human gum tell more in an instant than words can possibly convey.

Some of my own contributions to the growth of the science of periodontology,

1. Hartzell, T. B.: D. Cosmos, 69:1100 (Nov.) 1927.

which number a hundred or more articles, emphasize the harmfulness of too deep cutting of the cemental surfaces, and years ago I was able to make three ground sections of cemental surfaces. One shows the pits in the cementum from which the paradental membrane fibers arise. The second shows cementoblasts with their canaliculi reaching so nearly to the surface of the cementum that they are readily exposed to infection by too deep cutting, and infection thus introduced into the body of the cementum can never be eradicated, a constant focus of infection being thus created in the cementum. The third shows the deeper structure of the cementum and how very close the cementoblasts are to the surface of the root. This work was done to emphasize the importance of not cutting cemental surfaces at all, because if a careless operator gouges in the cemental surfaces, he opens up to infection the delicate cellular structure, which, because of its porous nature, can never be disinfected; thereby making certain that a permanent island of infection exists there until the tooth is lost.

These particular illustrations can be found in the *Journal-Lancet,* April, 1916. They illustrate, in part, a paper the title of which is "The Mouth as a Factor in the Pathogenesis of Heart, Kidney and Joint Inflammations."

Another paper that I think marks a step in the treatment of pyorrhea discussed "Emetin Versus Surgery in the Treatment of Pyorrhea" read before the First District Dental Society of the State of New York, Oct. 18, 1915, and before the National Dental Association in San Francisco in the same year. This contribution, I believe, terminated the use of emetin in the treatment of pyorrhea.

A contribution based on cooperative work had to do with bacterial toxins and ferments, and how to detoxify them.[2] I further offer my thesis that the neutralization or detoxification of the products of bacterial growth offers the direct point of attack in gaining the upper hand of all pyorrhea inflammations because it is not the bacteria themselves but their ferments which destroy the tissue.

This discovery, made by Larson, of a simple harmless agent to neutralize bacterial ferments is of supreme importance, first, because of the impossibility of totally clearing the mouth of bacteria, and, secondly, because of the ease of neutralizing their ferment with it, which makes it the most useful aid to dentistry now known. It is fortunate that a knowledge of it has become nationwide. Larson tried it against 200 different bacterial ferments and it failed to render harmless one single one; namely, botulinus, found in spoiling foodstuffs, a bacterial ferment and toxin which has killed whole groups of people who have partaken of it in foods that were not absolutely fresh.

2. Hartzell, T. B., and Larson, W. P.: Further Observations on Detoxification of Bacterial Toxins, J.A.D.A., 13:1147 (Aug.) 1926.

CAVERNOUS ANGIOMA WITH SEPTIC THROMBOSIS OF DENTAL ORIGIN: REPORT OF CASE

By J. ORTON GOODSELL, D.D.Sc., and CLARENCE E. TOSHACH, M.D., F.A.C.S., Saginaw, Mich.

CAPILLARY angioma occurring on the lip or tongue or within the buccal vestibule is relatively common. It forms purplish red patches which are easily recognized and which correspond to vascular nevi in other parts of the body. It is congenital and composed of a more or less closed system of small vessels originating from endothelial buds. Irradiation is likely to be successful in their treatment by the production of an obliterative endarteritis.

Cavernous angioma, on the other hand, is rarer. It is either circumscribed or merges into the capillary form, the blood spaces being much larger than in the capillary type. It may involve the cheeks, lips, floor of the mouth and tongue and, when this extensive, it is not marked off from the surrounding tissue but may present subcutaneous ramifications and enter the muscle planes. It is quite compressible and may enlarge tremendously if the head is placed lower than the body. Cavernous angioma is also congenital and metastasis has been known to occur. Treatment is usually excision, ligation or injection. Irradiation may be of value in some cases.

The case report hereto appended is particularly interesting to us because one of us has seen the patient for at least twenty-five years, in a casual way, but not professionally. He can recall, many years ago, having seen the "man with the drooping large blue lower lip and chin."

REPORT OF CASE

A man, aged 49, reported at the office with an acute abscess about the lower left first bicuspid root. The area immediately back of it was edentulous. There was inflammatory involvement of the soft tissues just anterior to the submaxillary region, but it was difficult to establish the presence or absence of pus because of an associated large cavernous angioma. The neoplasm involved both cheeks, the lower lip, part of the palate, the right anterior faucial pillar and the submandibular area as far down as the clavicle on the right and the level of the larynx on the left. The patient stated that, shortly after birth, an attempt was made to remove the angioma, but a severe hemorrhage discouraged the operator and nearly proved fatal to the patient, whereupon the prediction was made that death would ensue before many years. Having lived with this prognostication in his mind for almost half a century, he possessed an attitude of surrender when he found an infectious process in the proximity of the growth. He felt sure that this was the end. At the time of his visit to the office, his temperature was around 101 degrees and, aside from an apprehensive facies, he appeared quite well. Complete dental roentgenograms were obtained at this time, as well as lateral jaw films. They revealed an area of bone destruction, not recent, about the bicuspid root and numerous phleboliths (Figs. 1-2). The patient was sent home with instructions to go to bed and apply ice packs to the face.

The following day, he had severe chills and he was then hospitalized. (It was

learned at this time that he had had frequent chills for four days prior to the first time he was seen.) His temperature on admission was 102 and promptly arose to 105. He was taken to the operating room and drainage attempted. Under conduction anesthesia, an incision was made on the lingual side of the edentulous portion of the alveolar ridge, and the periosteum was elevated and an instrument inserted along the bone over the crest, buccally, to a point opposite the bicuspid, remaining at all times under the periosteum (Fig. 3). The approach was made in that way because any other would have necessitated entrance through one of the caverns. A small amount of pus was found. A rubber-dam intra-oral drain was sutured

Fig. 1.—Area of old infection about bicuspid root; left side. A large phlebolith is immediately under it and other small ones are nearby.

in place and the patient returned to his room. For forty hours, the temperature pursued a septic course downward, alternating sharp rises and falls at about two-hour intervals, the lowest reading being 100.6 and the highest 104. On the third day in hospital, about forty-eight hours after operation, a chill occurred with a temperature record of 105.4 and a pulse of 170. During all this time, there was no noticeable change in the swelling. It was then decided that something should be done about the extra-oral inflammatory area, which at no time had been very large or at all fluctuant (except for the angioma). Under nitrous-oxide and ether, this induration was inspected.

Perhaps the ensuing difficulties can best be shown by quoting the operative record: "Isolated field with sterile drapes on left side. Incision made under swelling. Dissected through the skin with sharp dissection and bluntly divided around numerous veins within the mass. Slight amount of pus evacuated. Evidently an infected thrombus. Plain gauze inserted and just as this was finished a hemorrhage occurred from the right side of the angioma in two places, one at the corner of the lip and

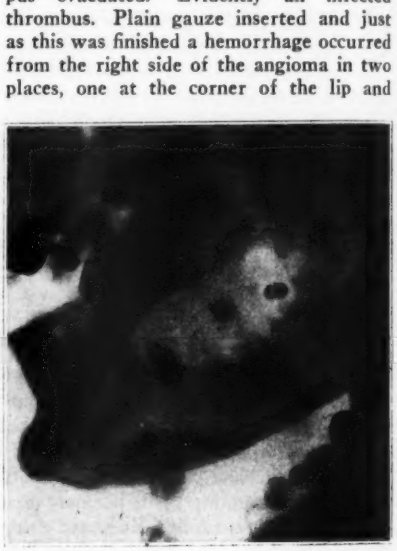


Fig. 2.—Appearance of right side. The phleboliths are much more numerous on this side, almost obscuring the rest of the film. The row on the lower right might be mistaken for buttons.

one in the floor of the buccal vestibule near the second bicuspid area. After the hemorrhage had continued for three or four minutes the patient collapsed and respiration ceased. Artificial respiration and carbon dioxide induced breathing after a lapse of about one-half or three-quarters of an hour. The lip was sutured together at the bleeding point (this was extremely difficult, for the wall was very thin—the outside surface being skin and the inside

surface vessel wall) and packs were inserted in the buccal vestibule, with pressure, the patient meanwhile being in an upright position. Finally, the hemorrhage stopped and the patient was returned to his room."

A record of the stimulants from the anesthetist's report is interesting:

(Patient collapsed at 7:34 p.m.) Epinephrine, 1 ampule at 7:35 p.m. Caffeine sodium benzoate, 1 ampule at 7:37 p.m. Caffeine sodium benzoate, ½ ampule at 7:40 p.m. Lobelin, 1 ampule at 7:45 p.m. Epinephrine, 1 ampule at 8:56 p.m. 600 c.c. of

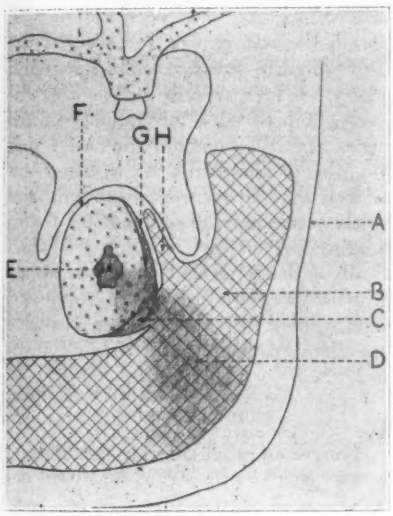


Fig. 3.—Diagram of cross-section through abscess, thrombus and angioma. *A*, skin; *B*, angioma; *C*, area of pus accumulation under periosteum; *D*, area of thrombosis; *E*, old root abscess which became acute and spread through bone to angioma; *F*, point of incision at first operation for drainage; *G*, periosteum elevated from bone by suppuration; *H*, arm of angioma under oral mucous membrane in buccal vestibule.

saline to thighs from 7:50 to 8:45 p.m. Morphine and atropine ¼ grain at 8:45 p.m.

Needless to say, the patient was in poor condition when he returned to his room. During the next four days, the temperature gradually subsided to a minimum of 100, at the same time showing less of the septic indications. In spite of the temperature improvement, the patient gradually grew weaker, and, three days after operation, the temperature again started to rise. A blood transfusion was given, but the patient died that evening.

The concurrent laboratory findings were as follows: two negative blood cultures; nonhemolytic streptococci and *Staphylococcus albus* in the pus; negative Wassermann reaction; red cells: third day in hospital, 3,710,000; hemoglobin, 75 per cent; red cells: eighth day in hospital, 3,490,000; hemoglobin, 60 per cent; differential count: third day in hospital, white cells: 13,250, 86 per cent polymorphonuclears, 13 per cent small lymphocytes, 1 per cent large mononuclears; differential: eighth day in hospital, white cells: 16,900, 92 per cent polymorphonuclears, 7 per cent small lymphocytes, 1 per cent large mononuclears; urine: essentially negative.

The family's refusal to allow a necropsy prevented us from completing the case as we would have desired, but the mere occurrence of a cavernous angioma in this area, complicated by septic thrombosis, was believed rare enough to merit reporting despite our failure to proceed with the postmortem examination.

If there is any one thing to be learned from this case, it seems to be the need for painstaking dental care in patients having oral angioma. The prevention of this septic thrombus would have been much more simple than its cure. In this particular case, dentistry failed in its duty, although the patient, no doubt, contributed to his own difficulties. He did state that he had always had trouble in inducing dentists to operate in his mouth. One look into a cavity surrounded by potential bleeding points usually proved enough to discourage the most conscientious dentist.

ANESTHESIA IN DENTISTRY WITH EMPHASIS ON PREOPERATIVE MEDICATION*

By JOHN S. LUNDY, M.D., and RALPH M. TOVELL, M.D., Rochester, Minn.

DENTISTS were among the first to point out the way to the use of general anesthetic agents for general surgical procedures. Members of the medical profession are greatly indebted to dental surgeons for this help, and it is to be hoped that the former have been, or will be, able to reciprocate. Because of the ambulatory nature of dental cases, it is essential that the patient recover quickly from the effect of a general anesthetic. This has made it necessary to avoid the use of such an agent as ether, its continued effect going beyond the requirements for extraction.

The choice of anesthetics has been limited because the risks of anesthesia must be limited. If the risk of extraction is to be minimal, it is essential that the risks of anesthesia also be minimal. We have discussed the question of risk previously, and we are increasingly impressed with the desirability of caution in using a general anesthetic on certain patients who are, or could be, recognized as presenting bad risks before operation. Because the patients who constitute a grave risk, of whom we spoke, comprise such a small percentage of the total number of patients to be operated on, we doubt that the warning was taken seriously by very many.

*From the Section on Anesthesia, The Mayo Clinic.

*Read at the Sixteenth Annual Meeting of the American Society of Oral Surgeons and Exodontists St. Paul, Minn., Aug. 3, 1934.

CHLOROFORM

Although the use of chloroform is condemned by those who are supposed to know most about its physiologic effects and about fatal immediate and remote results of its use, even recently, that is, within the last two or three years, the ACE mixture (alcohol, chloroform and ether) has been revived and used extensively, at least on a fair number of patients. Yet it is common knowledge that mixtures of anesthetics are as dangerous as their most dangerous constituent, and it has been shown experimentally that a mixture containing chloroform is practically as dangerous as chloroform alone.[1] The use of chloroform by the dental surgeon, unless there is no other available anesthetic, cannot at this time be justified.

ETHYL CHLORIDE

The use of ethyl chloride for freezing is unsatisfactory as a rule, and need not be discussed at this time. As an anesthetic agent to be administered by inhalation, it is to be considered, because it has certain advantages, but probably not for dental work, as will appear. The advantages are: easy portability, quick induction, quick recovery and ease of administration. Untoward results with it have been reported when administration has been in the hands of inexperienced persons. The essential point to be stressed has to do with the method of administration. This agent should not be sprayed

on the mask, but should be dropped on just as chloroform is administered. Deep anesthesia should not be attempted. Inspiration must be watched closely, and it is probably because of its effect on respiration that ethyl chloride is particularly unsuitable in dental surgery. Dental procedures, because they involve the mouth, often interfere with normal breathing, and so the untoward effect of ethyl chloride in many cases may be exaggerated. On the other hand, at the Children's Dental Clinic in Boston, this agent has been used over a period of years in a large number of cases, with none but good results. This is interesting, since children frequently have enlarged tonsils, and so may have greater respiratory obstruction than the average adult experiences. Mixtures containing ethyl chloride usually contain chloroform also, and ethyl chloride is second only to chloroform in potency, and probably also in danger to the patient. When there is any agent other than ethyl chloride, except chloroform, to choose from, ethyl chloride is not to be recommended, certainly for general use, although some persons skilful in its administration find it valuable.

NITROUS OXIDE

The use of nitrous oxide is so familiar to all that discussion of it will be limited. It is without doubt the best agent available for general anesthesia in dental surgery, from the point of view of the patient, of the dental surgeon and of the anesthetist, regardless of the cost of its manufacture and transportation, and of the apparatus by means of which it is administered. In our experience, it has been necessary, in difficult cases, to reinforce it with other agents, and we have supplemented it with ether, chloroform, ethyl chloride and various mixtures of these three agents. In each instance, addition of any or all of these agents has been unsatisfactory for one reason or another, delaying the patient's recovery, and usually adding to the degree of nausea and vomiting that would ordinarily be expected.

CYCLOPROPANE

Recently, a new gas, cyclopropane, has been introduced. It has been recommended by Waters. It has a high degree of potency in low concentration and is not dangerous in concentrations in which it is effective as an anesthetic. At the present moment it is too expensive to be used as nitrous oxide is used. However, it may be mixed with nitrous oxide just as one adds chloroform to nitrous oxide, that is, in very small quantities and never in high concentration at any one time. The effect produced by the mixture is usually satisfactory.

ETHYLENE

Ethylene can be used for dental operations, but for several reasons has not proved so satisfactory as was at first expected. It has certain disadvantages that cannot be overcome; namely, it has a distinct odor, it is highly inflammable and explosive and it causes more nausea than is associated with the use of nitrous oxide. It is more potent than nitrous oxide and has certain advantages which warrant a trial of it in dental cases.

COMBINED ANESTHESIA

In the last few years, there has been rather general revival of the use, in varying degrees, of combined anesthesia; that is, one agent has been used, or more than one, to produce a condition which would pass into a condition of anesthesia when the mild effect of another anesthetic agent was added, and yet the patient suffers little risk because of the safety of the dose of each individual drug administered. One of us (J. S. L.) previously

has described a somewhat analogous procedure under the term "balanced anesthesia," in which the dose of no single agent is sufficient to produce surgical anesthesia.

PRELIMINARY MEDICATION

Basic anesthesia is more frequently mentioned at present in connection with the use of avertin (tribromethyl-alcohol), a drug the effects of which last too long for its satisfactory application in many dental cases. Morphine and the barbiturates produce effects that are useful in these cases. The barbiturate usually gives the patient a sense of well-being, and eliminates almost all sense of fear and apprehension. The dose need not be large. For example, a barbiturate the effect of which is of short duration, i.e., pentobarbital sodium (nembutal), frees the patient from these disagreeable emotions. The dose is usually 1½ to 3 grains (0.1 to 0.2 gm.). Morphine may be given to augment the effect. The usual dose is one-sixth to one-fourth grain (0.01 to 0.016 gm.). A patient who has been given such preliminary medication is much more easily anesthetized than is one who has not. The desirable effect is one of hypnosis rather than analgesia. The average patient is sufficiently affected by this preliminary medication that nitrous oxide usually need not be reinforced by other agents. At the same time, the risk is not increased, because the individual tolerates a small dose of each agent very well.

BARBITURATES ADMINISTERED INTRAVENOUSLY

Recently, a new series of barbiturates have become available as general anesthetics. One of them, evipal soluble (sodium salt of n-methyl-cyclohexenyl-methyl-malonyl-urea) is being used in an increasingly large number of cases. Its effect is ordinarily very brief, and, in the average case, is satisfactory to all concerned. It should be used only for operations lasting not longer than thirty minutes, and one should be prepared to have the patient rest in the office for at least an hour before leaving.

In the cases in which we have used evipal soluble, the best results have been obtained from small doses, and it has been used effectively in small doses when there has been some preliminary medication, such as by morphine and pentobarbital sodium, using a little more morphine than usual. For example, one-sixth grain (0.01 gm.) of morphine is used instead of the usual one-eighth grain (0.008 gm.), or one-fourth grain (0.016 gm.) is used instead of the usual one-sixth grain. Recently, the use of morphine intravenously, just before administration of evipal soluble, has given promising results. In the use of this barbiturate, much the same precautions are observed as in the use of the others, except that the rate of administration is more rapid, and we like to give it intermittently, that is, to produce anesthesia with 2 or 3 c.c. (1½ grain, or 0.1 gm., to the cubic centimeter) and to keep the needle in the vein, repeating this dose as the patient requires it.

Thionembutal is another of the series of short-acting barbiturates, and although our experience with it is limited, it seems to be as effective as evipal soluble.

Granulocytopenia.—Recently, in relation to the use of barbiturates, attention has been called by Watkins and others to granulocytopenia. This serious condition has not been thoroughly understood, and it has been suggested that certain drugs might be etiologic factors in its occurrence. One class of these drugs is the barbiturates. We have not seen this condition result from large doses of one of the barbiturates given from time to time, both for short periods and for periods of

months. From our experience with the barbiturates, it did not seem reasonable that they would produce granulocytopenia if the patient was normal. Recently, Heck has called attention to a case of this disease in which the patient gave positive assurance that she had not used any barbiturate. Similar cases will no doubt be observed and reported, and hope prompts the thought that the true relationship of the barbiturates to granulocytopenia will be shown to be casual rather than etiologic. Few surgeons use a barbiturate for more than one or two doses prior to, or immediately after, administration of an anesthetic for a dental operation. We believe that it is a relatively safe thing to do, and would have little or no effect on the development of a disease such as granulocytopenia. Recently, in a report by the Council on Pharmacy and Chemistry of the American Medical Association, it was stated that barbiturates are not etiologic factors in granulocytopenia.

COBEFRIN

We have been interested in the search for a substitute for epinephrine, which is so frequently used with a local anesthetic. We have tried ephedrine, but it was not satisfactory as a substitute. More recently, we have tried cobefrin, and it seems to be a substitute for epinephrine. Members of the Section on Dental Surgery of The Mayo Clinic have found that when it was used in great dilution, it did not give quite so dry a field as when epinephrine was used. It has been investigated experimentally by E. B. Tuohy and H. E. Essex. We believe that for many operations in which the effect of epinephrine should be avoided, cobefrin may be substituted. A further study of the proper strength of solution will determine the use of this agent in the future.

LOCAL ANESTHESIA

Local anesthesia has been widely applied with great satisfaction in so many dental cases that it does not need to be discussed in detail. One of the changes of recent years that have seemed to us to increase the flexibility and satisfaction with which local anesthesia is used in dental cases has been the giving of small doses of barbiturates in preliminary medication. The antispasmodic properties of a barbiturate, together with its hypnotic and sedative effects, make it valuable in connection with the use of a local anesthetic agent agent such as procaine, injection of which into a blood vessel may cause a convulsion, and, under certain circumstances, such as in weak heart, may cause death.

MAGILL'S INTRATRACHEAL TECHNIC

In the cases requiring general anesthesia, a small number of the patients do not take a general anesthetic well, and when a dental operation is to be so extensive that any difficulty with the general anesthetic would interfere with the satisfactory accomplishment of the operation, we have used Magill's intratracheal technic, which makes administration of a general anesthetic easy. It is our custom to spray the throat with 5 per cent butyn or 10 per cent cocaine after the patient has been given preliminary medication, such as with pentobarbital sodium, 3 grains (0.2 gm.) and morphine sulphate, one-sixth grain (0.01 gm.), and atropine, one-one hundred fiftieth grain (0.0004 gm.), for the average adult, at least thirty to forty-five minutes before operation.

The DePass type of mouth prop is inserted in the left side of the mouth, and the patient is anesthetized with nitrous oxide cyclopropane, with or without ether. A greased tube of soft rubber of a large bore is then inserted through the nose into the throat, larynx and trachea, us-

ually without a laryngoscope. If the tube, on repeated trial, will not enter the trachea on blind intubation, the trachea and epiglottis may be lifted on the laryngoscope and the glottis exposed, and the tube may be introduced by pressure on the tube outside the nose, or, by use of Magill's forceps, may be directed into the glottis. Any of the ordinary general anesthetic agents may be administered by inhalation or insufflation. Anesthesia is even, and the level of it does not vary much as the operation progresses. The throat may be thoroughly packed since the patient breathes entirely through the tube.

During anesthesia, marked positive pressure in the bag should be avoided. A maximal pressure in the bag of from 5 to 7 mm. of mercury is sufficient; that is, the bag should not be greatly distended. This procedure may sound formidable, but if it is carried out as outlined, it is very easily accomplished. On the other hand, if there is deviation from the plan, difficulties occur. For example, if preliminary medication is given at too short an interval before anesthesia, so that it is ineffective, much more of the general anesthetic agent may be necessary than otherwise, and it is practically impossible to avoid the use of ether under such circumstances. If spraying of the throat is omitted, more general anesthesia is necessary than otherwise. It will be obvious that once the tube and the throat packs are in place, the possibility of inspiration of material from the mouth is reduced to a minimum.

We recommend the use of Magill's technic in selected cases. The status of anesthesia in dental practice is and has for years been on a relatively high plane, and, in all probability, it is safe to say that the easy case is easy for practically everyone, but that it is in connection with the difficult case that much work could be done at the present time, and it is for use in the difficult case that we recommend Magill's technic.

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DISCUSSION

Earle H. Thomas, Chicago, Ill.: Many men realize the responsibility involved in administering a general anesthetic, but do not appreciate the responsibilities they take in injecting a local anesthetic. I was glad to hear Dr. Lundy mention that the injection of procaine into a vein, in some cases, can cause the death of a patient. There are many contraindications from a general standpoint to the injection of the various local anesthetics, but there are also contraindications from the standpoint of regional conditions. For instance, many cases of osteomyelitis are caused by the injection of local anesthetics into acutely inflamed areas. I should like to have Dr. Lundy discuss whether the so-called vagus effect (tingling of the fingers, restlessness, syncope and pounding of the heart) is due to the toxicity of the procaine or the epinephrine; also to compare epinephrine and cobefrin as to their general effects. Cobefrin was criticized on the ground that it did not control the bleeding to so great an extent as does epinephrine. This should not be called detrimental as it is really beneficial when a local anesthetic is used for operations on bone. The majority of dentists use solutions containing too high a percentage of epinephrine and this is one cause of the postoperative troubles so frequently experienced by some operators. Much better postoperative results are obtained if there is continual slight hemorrhage from the bone instead of its being dry and exposed during the operation. I use, in prepared solutions, the weakest epinephrine content that I can obtain and perform most operations under anesthesia by such solutions. I am reminded that one

company puts out two solutions, one regular and one special. The regular, which contains far more epinephrine than the special is the one most dentists use. From my experience, I would say that the names of the two solutions should be transposed, making regular the one with the least epinephrine content. The percentage of epinephrine contained in the special lasts over an hour—sufficient time for a competent operator to perform almost any operation. Adding a higher percentage of epinephrine only causes trouble when bone operations are concerned.

Dr. Lundy: I believe that I can cover this discussion more rapidly and with better satisfaction if I will proceed with the questions that Dr. Thomas mailed to me, and the answers that I have prepared:

1. What preoperative drug works the most rapidly and at the same time loses its effect the fastest? In other words, which one is the most satisfactory from the time standpoint for office patients?

Answer: Nembutal (pentobarbital sodium).

2. What is the minimum preoperative examination you consider necessary for legal protection in case of an unfortunate occurrence with (*a*) ordinary procaine solutions, (*b*) evipal soluble and (*c*) nitrous oxide?

Answer: (*a*) The patient should be asked whether he has any physical weakness that he knows of and, if he has, it should be checked. The pulse should be examined for both rate and volume and the patient should be questioned as to the history of any previous procaine reaction. He should also be asked whether he is sensitive to foods or if he has had hay-fever. Procaine reactions are often considered and classed as due to drug allergy and these leads should be important from the legal point of view. (*b*) It should be known that the lungs are clear, that the heart is in good condition and that there is no hypotension or hypertension.

3. What, in detail, are the procedures you should follow if a patient collapses after or during the administration of (*a*) ordinary procaine solutions, (*b*) evipal soluble and (*c*) nitrous oxide?

Answer: (*a*) Ventilate the patient's lungs by artificial respiration, either manually or mechanically or by administration of oxygen. If there are convulsions, it is desirable to give an antispasmodic so that the patient can breathe. One of the soluble barbiturates given intravenously can be relied on to control these convulsions and the heart may stop and must be stimulated. The patient should be watched for several hours after the first attack, as some patients have a second and even a third attack. There is likely to be a great fall in blood pressure and cessation of respiration. Artificial respiration or insufflation of oxygen 90 per cent and carbon dioxide 10 per cent and the intravenous administration of epinephrine, pituitrin, ephedrine or cobefrin should be carried out. If there are convulsions, a barbiturate should be given intravenously while the oxygen is being administered. One should try to determine the blood pressure and the pulse, and if the blood pressure is low, it must be raised by much more cautious procedure than under these circumstances when evipal soluble has been given. For example, about twelve years ago, I was consulted about a patient who had collapsed after nitrous oxide anesthesia. The blood pressure rose considerably when an aneurysm ruptured in the chest and the patient bled to death in about two hours after an extraction. Evidently, the tear in the aneurysm was small at the time of operation and the hole kept widening for an hour or two afterward. The patient died in the dentist's recovery room.

4. Please discuss the toxicity of procaine and tell some of the serious results of its use.

Answer: The toxicity of procaine depends on the rate of absorption in the blood stream, and the severity of the symptoms depends on the amount in the blood stream at a given time. The usual toxic effect is to lower the blood pressure. Pallor, sweating, nausea and cyanosis occur. Usually, in severe reactions, a convulsion or convul-

sions occur in the normal patient. If the dose is large enough and the attack severe enough, the patient will succumb. Usually, the normal patient, after recovery from such an attack, is not sensitized to it and he could go through almost the same attack again. In the normal individual, the effects, if not fatal immediately, are of a transitory nature, and there is no permanent injury. In the patient who is sensitive to procaine, even as much as 0.5 c.c. of a 1 or 0.5 per cent solution of procaine may precipitate an attack of dyspnea, apprehension, tremor with fall in blood pressure, signs of shock, unconsciousness and, in some instances, almost complete respiratory failure. These patients who suffer from drug allergy always, while they retain their sensitivity to the drug, manifest the same symptoms whenever the drug is given. To these patients, procaine should not be given, even intradermally to test for sensitivity, but the patch test should be used on the unbroken skin surface. The allergic individual may succumb if the dose administered is large enough. There are no permanent untoward results if he recovers.

5. Is syncope, restlessness, tingling in the fingers and pounding of the heart immediately following administration of ordinary procaine solutions due to the procaine or the epinephrine?

Answer: These symptoms are due to the epinephrine that has been injected in addition to the symptoms arising from excitement.

6. In what general conditions do you consider it advisable to inject solutions containing epinephrine? Please discuss cofebrin in relation to these conditions.

Answer: Epinephrine should not be injected in the presence of toxic goiter, in highly excited persons, in the presence of extreme hypertension. As regards cofebrin, it should be used the same as epinephrine.

7. In what general conditions would you consider it (*a*) a slight risk and (*b*) a grave risk to administer nitrous oxide and oxygen?

Answer: It would be a slight risk to administer nitrous oxide and oxygen to a normal adult with a free airway for the extraction of one or two teeth. Grave risk would arise in the administration of nitrous oxygen to a child with respiratory obstruction, such as large tonsils, or to a patient who has recently had a meal, to one who has extreme hypertension with cardiac decompensation, to one with serious pulmonary disease, especially in the presence of cavitation or marked bronchiectasis, or to one with a recent history of hemorrhage of the brain ("stroke"). Reactions to epinephrine or procaine may be differentiated. Reaction to procaine is associated with slow pulse of fair quality, while reaction to epinephrine is characterized by rapid pulse and the patient complains of pounding in the chest.

Epinephrine that we manufacture in a period of fear is sufficient to support us for not over twelve minutes, and then is burned up. I may say, if you inject both drugs you may get both reactions, but the epinephrine will give a reaction first, and the procaine reaction will follow. With regard to the intratracheal anesthesia: I am satisfied in my own mind and I have asked G. B. New, a plastic and oral surgeon at The Mayo Clinic, his opinion, about the trauma that the tube might do as it lies in place over a period of five minutes to fifteen hours. Dr. New says that the tube will not do damage as it lies in place. I think that is true—that the trauma occurs when the tube is placed. The glottis, the vocal cords, are so strong, fortunately for us all, that we can hardly pass that tube if the glottis or the vocal cords come together. The tube has to begin its entry before the cords come together in the midline. Spraying these cords makes passing the tube easier. If the patient is well anesthetized, the cords will stand apart. The carbon dioxide that Dr. Heidbrink mentioned makes the cords open up when given in fairly strong concentration, say 5 to 10 per cent, but the trauma is due to the placing of the tube, and the direct hitting of the vocal cords with the tube itself.

As to nose bleeding and a little bleeding

in the nasopharynx, etc., I have never seen any untoward results from that; but when the vocal cords have been traumatized, hoarseness results.

C. H. Burmeister, Cincinnati, Ohio: What experience have you had with avertin, and also procaine, when the solution is buffered? Have you noticed any difference in the effect of epinephrine?

Dr. Lundy: I see no difference in the buffer solution over the one that is not buffered. With regard to avertin, I have had a little experience with it. If we have this intratracheal method available, we will not be bothered with avertin. It is just a matter of which method is available. If I did not have the intratracheal method, I would use the avertin, but this other method is greatly superior to its use. As a matter of fact, to carry out avertin anesthesia properly, we must use a Magill intratracheal tube. If avertin is carefully made up and if the dose is kept small, there is no reason that it cannot be used with great success. On the other hand, there is no rectal method that is very convenient for a dentist. In the hospital, there is nobody that would rather give an enema than a hypodermic. The avertin solution has to be made up properly. It takes a little while to do it, and there is always a possibility it will be done wrong.

Dr. Shearer: Dr. Lundy spoke of using a 20 per cent solution of procaine in the dog intravenously. What are you trying to prove by that, Dr. Lundy?

Dr. Lundy: I was trying to show the untoward effect of procaine by getting an exaggerated effect. I can get the same effect if I put in twice as much of the 10 per cent at the same rate, or twenty times as much of the 1 per cent.

DISEASES OF THE SOFT TISSUES OF THE MOUTH*

By FREDERICK A. FIGI, M.D., Rochester, Minn.

DISEASES of the soft tissues of the mouth are of the utmost importance to the dentist. They may occur as a manifestation of some systemic disturbance or as a purely local process. Often, the pathologic changes within the mouth in general disease precede symptoms and signs elsewhere in the body by a considerable period of time, and they may be sufficiently characteristic to permit of a positive diagnosis in the early stages of the illness. Moreover, local disease, notably malignancy, will at times progress to an advanced stage before producing symptoms severe enough to cause the victim concern. Many of these persons come under the observation and care of the dentist primarily and while the disease is in its incipiency, the responsibility of early recognition thus becoming his responsibility. This does not mean that he need be qualified to treat the patient, but he should be able to appreciate deviations from the normal that require further investigation or special treatment.

A wide variety of pathologic conditions occur in the soft tissues of the mouth. Included are a number of inflammatory, metabolic and neoplastic lesions of varying seriousness. Some of them are self-limiting, tend to regress spontaneously and produce no serious results. Others

*From the Section on Laryngology, Oral and Plastic Surgery, The Mayo Clinic.

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tend to progress and, if not controlled, result in severe debility or death. Some occur quite commonly, whereas others are so rare as to be of little more than academic interest. As it is obviously impossible to discuss here in detail all of the different diseases affecting the soft tissues of this region, only those most frequently encountered or of particular interest for other reasons will be considered. Symptoms and diagnosis are of greatest interest to the dentist, and these rather than treatment will be stressed.

Gingivitis is, with the exception of true periodontitis, probably the most common disease of the soft tissues of the mouth that comes to the attention of the dentist; and because of its intimate relation to dental structures, it is of the greatest interest to him. While the inflammatory process usually remains limited to the alveolar margins, it may involve the remaining tissues of the mouth more or less extensively. A number of different forms of gingivitis occur which are familiar to all of you. The most important of these is the necrotic type, commonly known as Vincent's infection or trench mouth. The symptoms and diagnostic features of this condition need not be reviewed; but special attention should be directed toward the differential diagnosis. The changes in the mouth associated with certain blood dyscrasias, particularly with acute and chronic lymphatic leukemia, at times so closely resemble those associated with this type of gingivitis as to be indistinguishable from it on clinical examination alone. A definite diagnosis should always be withheld in cases of this type until hematologic studies have been made, even though smears from the gingival ulcerations disclose numerous Vincent organisms. Making a diagnosis of Vincent's gingivitis on the basis of such lesions in the mouth and giving a favorable prognosis only to learn later that the condition actually is a hopeless blood dyscrasia is an experience that few care to repeat.

A condition which has received considerable attention and study in recent years and in which the lesions in the mouth are frequently suggestive of Vincent's infection is agranulocytosis. This disease, of indeterminate etiology, is characterized by marked anemia, leukopenia and the disappearance of the polymorphonuclear leukocytes from the blood. There would be little likelihood of confusing this picture with that of the former condition, as the patient with agranulocytosis is very obviously acutely and seriously ill.

Two other diseases producing lesions in the mouth that might be confused with Vincent's infection are sprue and scurvy. These conditions have rarely been encountered in this climate in modern times.

The oral lesions of the acute exanthemas: measles, scarlet fever and smallpox, need scarcely be mentioned here, as it is not likely that patients in the prodromal stages of these diseases would present themselves for dental care.

Among the infectious granulomas, syphilis, tuberculosis, actinomycosis, blastomycosis, rhinoscleroma and leprosy at times produce pathologic changes in the soft tissues of the mouth. The lesions of primary, secondary, or tertiary syphilis often appear in this situation. The primary sore, or chancre, is more commonly seen on the margins of the lip, although it may occur on the tongue or elsewhere inside the mouth. It is characterized by marked induration and ulceration, and by enlargement of regional lymph nodes. Secondary syphilis may be manifest in the mouth by the presence of mucous patches, rashes similar to those occurring on the body, glossitis or a persistent ulceropapular sore throat. Tertiary syphilitic lesions in this region include gummas in various stages, scarring of the palate

or of the pharynx or perforation of the palate secondary to gumma, leukoplakia and chronic glossitis. While the secondary lesions are likely to be difficult of recognition, the history of a primary sore and of exposure, if obtainable, will help. The appearance of the chancre is, as a rule, sufficiently suggestive to lead one in doubt to seek further consultation. Tertiary syphilitic changes in the mouth are likely to be accompanied by other evidences of the disease.

Tuberculous lesions of the mouth occur infrequently considering the prevalence of tuberculosis. They are most commonly found among persons with advanced pulmonary involvement and usually appear as painful superficial irregular ulcers. These ulcers bleed readily and are often multiple. They may be present on any portion of the oral mucous membrane. There is often little evidence of inflammatory reaction and induration in surrounding tissues. These ulcers indicate a low degree of resistance to the infection on the part of the patient and, as a rule, justify an unfavorable prognosis. At times, especially about the jaws, these ulcers extend deeply and, in rare instances, they erode the bone. Provided there is not too much secondary infection present, direct scrapings from the ulcers properly stained will often reveal the presence of the bacillus of tuberculosis, thereby confirming the diagnosis.

A type of tuberculous lesion which has come to my attention several times is the solitary tuberculoma. These have developed insidiously and painlessly and have been situated in the lips, tongue or cheek. They have presented the characteristic histologic picture of tuberculosis, with formation of tubercles, lymphocytic infiltration, caseation and the presence of giant cells. Their exact relationship to pulmonary tuberculosis is indefinite. Although roentgenograms of the thorax in these cases gave evidence of pulmonary involvement, there was neither clinical nor roentgenographic evidence of activity. None of the tumors revealed any tendency to suppurate. The histologic picture of gumma is practically indistinguishable from that of tuberculoma. In all of these cases, the serologic findings were negative. Excision was at times followed by recurrence, and irradiation was quite effective in controlling the condition.

Although actinomycosis occurs quite commonly on and near the cutaneous surface of the cheeks and in the parotid, submaxillary and cervical regions, it only rarely involves the mandible itself and the mucous membrane of the mouth. In a group of more than 400 cases of actinomycosis of the head and neck seen at The Mayo Clinic, the tongue was involved primarily in approximately twenty cases, the buccal folds in only two and the mandible in less than ten. The frequent involvement of the mandible with actinomycosis reported by some investigators is difficult to explain, unless it was due to marked secondary infection or to a very advanced stage of the disease. Even in the most advanced cases coming under my observation, including those in which the condition proved fatal, involvement of bone was unusual. The extreme hardness of the inflammatory mass and its intimate attachment to the mandible often make it appear on clinical examination that the bone is involved, and only by means of roentgen rays can the extrinsic character of the tumor be determined.

The clinical history of patients with actinomycosis in this region depends on the virulence of the infection and on the degree of secondary infection. The condition may occur as an acute phlegmon following dental extraction, and the symptoms be indistinguishable from those caused by pyogenic infection. Trismus,

pain and swelling are the most common symptoms. In the tongue, the condition may be acute in onset, with severe pain, throbbing, local tenderness, general malaise and an elevation of temperature as in pyogenic abscess in this situation. On the other hand, it may develop insidiously during the course of several months. Slow progression is the rule in the absence of secondary infection. While enlargement of regional lymph nodes occurs, only staphylococci, never the actinomyces, have been demonstrated in these. Frequently, the tumor in the tongue appears on clinical examination to be a benign fibrous nodule or an infected cyst. Within the course of a few days, the process may flare up acutely, and a large portion of the tongue may become involved in the inflammatory process. When the posterior portion of the tongue is involved, dysphagia may be extreme, so that the patient is unable to swallow even fluids. If the abscess is not drained and the nature of the condition is not recognized, spontaneous rupture with subsequent repocketing and extension of the infection occurs. Ultimately, the entire tongue and floor of the mouth may become involved, and the process may extend through to the submaxillary and submental regions. Diagnosis is based on demonstration of the so-called "sulphur bodies" or the actinomyces. While these can often be found in microscopic sections of the excised tumor, they are much more readily obtained in the purulent discharge from the abscess at the time of incision. With proper treatment, the prognosis is good.

Although blastomycosis, rhinoscleroma and leprosy do at times occur about the mouth, the conditions are rare, especially the two latter in this country, and they need not be elaborated on here.

Thrush may occur in the mouth as either an acute or a chronic process. It is due to the yeast fungus *Oidium saccharomyces* or *Oidium albicans*. The acute form of the disease occurs most commonly among nursing and malnourished children of less than 5 years, and among aged or debilitated persons. It is not infrequently encountered during the later stages of tuberculosis and other wasting diseases and during convalescence after severe abdominal surgical operations. The condition is characterized by the presence of whitish or grayish exudate-like patches covering a varying amount of the oral mucosa. As these patches are wiped away, an excoriated, often oozing, surface is exposed which is extremely tender. There is commonly so much discomfort associated with the disease that nourishment is interfered with to a marked extent. The appearance of the oral lesions is sufficiently characteristic to permit of recognition in a high percentage of cases. The diagnosis may be confirmed by films made from the membrane and by culture with demonstration of the yeast forms and mycelium.

The chronic form of thrush about the mouth is characterized by the presence of whitish threadlike areas within or below the mucous membrane which strongly resemble linear leukoplakia. The mucous membrane of the entire tongue, as well as of most of the remainder of the mouth, may be infiltrated by the process, and this same involvement may extend through a varying portion of the gastro-intestinal tract. When the process is well-localized in the mouth, destruction of the areas with the actual cautery or by electrocoagulation, followed by applications of gentian violet solution, is quite effective in relieving the discomfort, although complete eradication of the process is uncertain.

A number of different forms of stomatitis other than those already mentioned are encountered. Among these may be

mentioned the aphthous and herpetic types, the type associated with primary and secondary anemia and with erythema multiforme and also that due to chemicals and drugs, such as lead, bismuth, mercury and phosphorus. Each of these present more or less prominent features. Geographic tongue and Fordyce's disease scarcely warrant inclusion in this category, although they should be mentioned, since, to certain persons, they are a real source of concern. The former condition is characterized by the presence of slightly elevated, irregularly rounded, grayish rings surrounding reddened areas on the dorsum, tip or margins of the tongue. The grayish outlines seem to conform to pressure areas of the tongue against other intra-oral structures and have been assumed to be due to flattening out of the papillae. Patients complaining of symptoms in this connection usually date them from the time the appearance of the tongue first attracted their attention. The term Fordyce's disease is actually a misnomer. The condition referred to is the presence of numerous minute, yellowish, granular nodules within the mucous membrane of the lips and cheeks. These are normal sebaceous glands and do not represent a pathologic condition. Neither of these conditions require treatment.

The accumulation of lymphoid tissue, along either margin of the tongue posteriorly at its junction with the tonsillar pillar, belongs in this same group. The size of the lymphoid deposit varies greatly in different persons and on the two sides of the tongue in the same person, this variation often leading to concern over the possibility that the condition is a neoplasm.

Three principal types of leukoplakia, squamous, papillary and syphilitic, occur within the mouth. The clinical importance of these different forms varies greatly. The squamous type is of no significance unless it becomes thickened and leathery, in which event its elimination is indicated. Primarily, it appears to indicate a defensive reaction on the part of nature in an attempt to protect oral tissues from some chronic irritation. It may be present for years without causing any trouble whatsoever and without the patient's even being aware of its presence. While excessive, long continued use of tobacco is the most common cause of the condition, any form of irritation may be responsible. About the vermilion borders of the lips, this type of leukoplakia is much more prone to develop malignant change than within the mouth. Papillary leukoplakia is a potentially malignant lesion, tending to develop into the "frozen-doormat type" of low-grade, squamous-cell epithelioma, so-called because of its appearance. This form of leukoplakia is present as a thick, tough, warty, insensitive area and, like the other types, is often discovered accidentally by the patient. Syphilitic leukoplakia is usually found on the dorsum of the tongue or just within the angles of the mouth. The dorsum of the tongue in such cases presents a smooth, glistening, ironed-out, atrophic appearance. The thin lingual covering tends to thicken in certain portions. These portions ulcerate promptly and malignant change commonly occurs, the lesions most often being active, squamous-cell epitheliomas.

Black tongue, lingua nigra, appears primarily as a black, hairy area over the posterior portion of the dorsum of the tongue, but this may spread to involve most of the dorsum. The etiology of the condition is not known. Usually, there are no associated symptoms, but a foul taste is at times complained of. Treatment is usually of little avail. The condition tends to clear up spontaneously, but it may recur.

The earliest manifestations of pemphigus are frequently found in the mouth, and this disease must be considered in any case of persistent, ulcerative stomatitis. The characteristic oral lesions are small vesicles or blebs ranging up to 5 or 6 mm. in diameter. These may develop on any portion of the oral or pharyngeal mucosa, but they are often so inconspicuous that very careful search usually must be made for them. They are very thin-walled and rupture spontaneously in a short time. After rupture, the flaccid pellicle sloughs off, leaving a superficial ulcer which heals slowly. The lesions may be observed in any of these stages. Often, a large portion of the lining of the mouth is involved by the ulcers and the patients are very uncomfortable. Treatment has not proved very effective in controlling this condition to date. The unfavorable prognosis renders early recognition desirable. The most confusing condition in the differential diagnosis is erythema multiforme, which often produces lesions of similar appearance. There are definite periods of remission in erythema multiforme which furnish a prominent differential feature.

Various types of benign tumors develop in the soft tissues of the mouth. These include the different forms of epulis, hemangioma, lymphangioma, fibroma, adenoma and papilloma, and the mucous and dermoid cysts. Of these, the inflammatory, fibrous and giant-cell epulides are of greatest interest to the dentist. As the fibrous and giant-cell epulides arise from the periodontal membrane, their complete removal often necessitates sacrifice of the tooth the membrane of which is involved and cauterization of its socket. The hemangioma has a characteristic appearance and should occasion little difficulty in recognition. The lymphangioma presents an irregular, papillary surface with numerous small glistening vesicles and, at times, diffuse firm enlargement of the structure involved, as in macroglossia. Mucous cysts are thin-walled and are usually situated inside the lower lip. The dermoid cysts are thick-walled, have a doughy consistency on palpation and occur in the anterior part of the floor of the mouth.

Malignant tumors originating in the soft tissues of the mouth are chiefly epitheliomas. Adenocarcinoma of mixed-tumor type, sarcoma and hemangioendothelioma are encountered less frequently. With the exception of the mixed tumors, which occur almost entirely in the palate and pharynx and which are invariably slow growing, these neoplasms vary greatly in their degree of activity. According to the scale of Broders, they range from grade 1 to grade 4. Those originating on the alveolar processes and hard palate are usually less active than those arising from the floor of the mouth, tongue and cheeks, and they show less tendency to metastasize. Ulceration as a rule develops early and gives rise to the peculiar foul, fetid odor characteristic of oral malignant disease. The appearance and odor are often simulated by sloughing inflammatory lesions in this situation, but the induration of the tissues is rarely so marked as in malignancy. In a high percentage of cases, especially in those in which previous treatment has been given, biopsy is necessary for a positive diagnosis.

DISCUSSION

Daniel F. Lynch, Washinton, D. C.: How much dependence do you place on smears in the diagnosis of Vincent's disease of the mouth?

Dr. Figi: Diagnosis should always be withheld until blood studies, etc., have been made, even though the condition looks very definitely like Vincent's infection. There is always the possibility of a blood dyscrasia producing the characteristic clinical picture

of Vincent's, and many of the ulcers occurring in blood dyscrasias teem with Vincent's organisms. It is impossible to make a positive clinical diagnosis.

Dr. Lynch: I think you misunderstood me. Some men feel that a positive smear of Vincent's organisms justifies a diagnosis of Vincent's disease. I believe that Vincent's organisms can be found in almost all mouths. The clinical picture is the main thing. What is your opinion regarding the treatment of Vincent's disease in the mouth by intramuscular injection of sodium bismuth tartrate or neoarsphenamine?

Dr. Figi: I have had no experience with the former drug. The latter is very effective. We reserve it for cases that do not respond to the usual therapeutic measures. At times, we have made use of a 25 per cent solution of arsphenamine in glycerine, which is quite effective when applied locally.

Dr. Lynch: What do you think about the use of the roentgen rays in the treatment of acute phlegmons of the neck, actinomycosis and acute cellulitis?

Dr. Figi: In cellulitis, roentgen and radium therapy are effective. We have used irradiation very little in the acute phlegmons of the submaxillary and cervical region, but have used it a great deal in the treatment of phlegmons that were slow in suppurating. It is of decided advantage in these cases, as it often shortens the course to a decided extent.

Dr. Lynch: Do you believe that most cases of leukoplakia go on to malignancy?

Dr. Figi: Not by any means. It is rarely that the squamous type of leukoplakia in this situation undergoes malignant change. If definite thickening takes place in it, the area of thickening should be removed, but it is not necessary to disturb superficial leukoplakia. It is different when one is dealing with the papillary type, which is potentially malignant. The same is true of the syphilitic type. Any areas of thickening in syphilitic leukoplakia, especially of the tongue, should be looked on with considerable suspicion.

Dr. Lynch: In certain cases, ulcers treated with a caustic will clear up, but the malignant process continues, and unless the case is studied and kept under observation, there may be very serious results. Will you please discuss the question of keeping an ulcer under observation even though apparently healed.

Dr. Figi: I can best reply by citing two cases that came under observation recently, one in a man and the other in a woman, each approximately 50 years of age. They had developed superficial ulceration of the gums, which was treated with caustic, but persisted and extended more deeply. Later, after treatment with radium, the lesions healed, but the patients complained of greater discomfort. At the time we saw these patients, there was practically no ulceration of the surface of the alveolar process, but roentgenograms revealed extensive destruction of the bone. The malignant process had probably been present from the inception of the original lesion. In both of these cases, spontaneous fracture of the mandible followed the extensive diathermic destruction required.

A. B. Vastine, Bloomsburg, Pa.: In agranulocytosis, is the elimination of the lesions of the mouth, the tonsils, the vagina or the rectum effective in controlling the disease? I have had three cases that were thus controlled.

Dr. Figi: We like to see the sloughing ulcers in these cases heal and that is within certain limits a criterion of the improvement that is taking place in the disease. This is not always true. The condition will, of course, as you have observed, frequently recur later, and, many times, in cases that are prematurely reported as cured, death ultimately ensues.

Dr. Vastine: I have followed one case for five years, another for three years, and, in these cases, the use of the arsphenamine, a 50 per cent solution, was effective. In connection with the tongue, you did not mention the anemias. Is there a characteristic change in the papillae of the tongue that signifies a vitamin B deficiency, as well as the change associated with anemia?

Dr. Figi: There is a quite characteristic change which occurs on the surface of the tongue and is associated with primary

anemia, but it is not always sufficiently characteristic to permit of differentiating it from secondary anemia. Very often the picture is strikingly similar. I am not prepared to make a statement regarding vitamin B deficiency.

Nov 1935

THE MOUTH AS A FACTOR IN MAXILLARY SINUS DISEASE*

By GEORGE W. CHRISTIANSEN, A.B., D.D.S., Detroit, Mich.

SITUATED within each upper maxillary bone is a pneumatic space of irregular size and shape, bounded above by the orbital floor, laterally by the external wall of the maxilla, medially by the nasal wall, inferiorly by the roof of the mouth and posteriorly by the tuberosity. Projecting into the nasal cavity from the medial wall are three curved bony formations, the turbinate or concha bones which divide the anterior nares into the superior, middle and inferior meatuses. Just under the middle turbinate is the ostium maxillaris, which, under healthy conditions, provides ventilation and drainage for the antrum. Above, from the anterior portion, in a large percentage of cases, is a small tubular communication with the frontal sinus. The floor of the antrum is sometimes subdivided by one or more thin bony partitions rising from 0.5 to 2 cm. Root ends of bicuspid and molar teeth covered by a thin lamina of bone may project upward to cause considerable irregularity of this area.

The interior of the cavity is lined with mucous membrane, a continuation of the lining of the nose, and, as such, is subject to inflammatory conditions involving the latter. The maxillary sinus is primarily a nasal cavity, and all treatment of and operations on it should involve a thorough realization of this fact, or failure is probable. Any procedure which tends to divert antral drainage into the oral cavity from its natural course threatens mutilation. Nasal discharges are often very foul and rich in pathogenic organisms and septic matter, and yet tooth socket drainage of the antrum is practiced and even advocated. While it is true that some such openings heal, the practice is not advisable because of complications which may arise.

Because the antrum is closely allied to the nose in its diseases, its care is in the realm of the rhinologist, except in those cases in which mouth infection becomes a complication. Two truths deserve repetition here and should not be forgotten: Disease of the maxillary sinus resulting from mouth infection will not respond to nasal lavage regardless of how long such treatment is prolonged, and, conversely, extraction of all adjacent teeth, healthy and otherwise, will not improve infection of an antrum arising from a nasal condition.

The antrum may become diseased from mouth contamination in a number of ways. Root end infection, an alveolar abscess or septic interdental pockets may perforate the floor and initiate inflammation of the membranous lining and

*Read at the Sixteenth Annual Meeting of the American Society of Oral Surgeons and Exodontists, St. Paul, Minn., Aug. 4, 1934.

necrosis of the bony tissues. Trauma from extraction and other sources may also be an important factor.

In the removal of upper molar teeth, the buccolingual forces sometimes fracture out the portion of the floor surrounded by the root ends. In this region, the root tips may act as a sort of cradle for that part of the floor, and the bone is very thin. No great surprise should be felt, therefore, when, after vigorous rocking, the tooth comes out with a liberal section of the adjacent bone. This is particularly liable to occur in the case of the first molar, while the second may fracture the bone just laterad from the roots, but which nevertheless establishes an antral-oral opening. Indeed most of us have experienced the sickening sensation of seeing the tuberosity and attached teeth yield instead of the desired tooth. Such an accident usually results in loss of the entire floor and the tuberosity and requires suturing to close the ominous looking laceration.

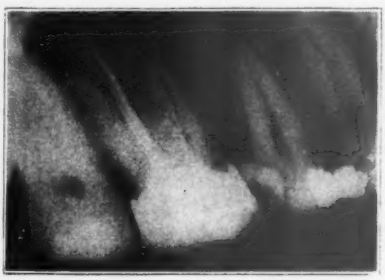

Fig. 1.—Abnormally low maxillary sinus floor with projection between first molar and bicuspid. The pulpless diseased first molar root ends extend into the sinus cavity.

Upper molar root tips are often fractured and, during recovery, may be pushed into the antrum. The lost portion is usually very small and the search is sometimes attempted through one of the sockets which has been slightly enlarged. If this fails, the size of the opening is increased, and even then the result may be fruitless, but the harm has already been done. The bone around the opening has been traumatized, a blood clot will not form because clotting has been interfered with, and there is no soft tissue to approximate and suture. This type of antral-oral opening is pernicious and often vigorously resists the best attempts at closure. The condition is further complicated if there is nasal disease, with drainage which involves the antrum. These secretions naturally will seek the more dependent opening and hence find their way into the mouth, and when this route is once established, it is difficult to change. If an attempt has been made to close the aperture with adjacent soft tissue, the presence of nasal discharge seeping through decreases the reparative power and tends to produce unhealthy granulation tissue.

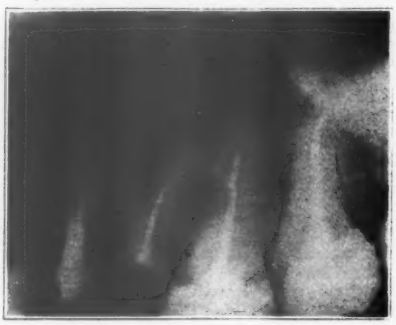

Fig. 2.—Four pulpless diseased teeth with root ends near sinus floor. The area above the second bicuspid has already penetrated the floor.

Thus, the tooth socket approach for root removal from the antrum is hazardous because of the possibility of latent disease lurking there. Certainly, the addition of mouth organisms is not desirable. Furthermore, the root may not be

found because of poor accessibility or the presence of septums.

Unerupted third-molar root ends sometimes penetrate the antral floor and, within a few days after their removal, an acute sinusitis develops, followed by a foul discharge through the socket and into the nose. This seems particularly true if the roentgenogram shows the crown of the unerupted tooth covered only with soft tissue. In such a case, there perhaps is seepage along the longitudinal surface of the tooth which causes an irritation and inflammation of the sinus lining at the point of perforation.

Horizontal fractures of the maxillae sometimes rupture through the nasal or

Fig. 3.—Molar root submerged in soft tissues. Periapical bone destruction has involved the inferior wall of the sinus.

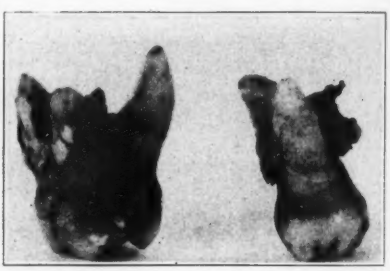

Fig. 4.—Retained teeth with attached masses of diseased soft tissue, retention sometimes resulting in condition seen in Figure 5.

lateral walls and establish mouth communication. If congestion and hemorrhage are not too profuse, there may be no delay in healing, but there is danger of injury to the blood and nerve supply of teeth whose roots are near the line of fracture. It is wise to make frequent roentgenographic examinations for six months or more to find as early as possible any teeth that have been devitalized by trauma. If not, an apical abscess may develop and unnecessarily penetrate the antral cavity.

Foreign bodies may be driven through the maxillary wall and carry away a large section of the floor. Such an accident usually results in sinusitis from bruising and injury to the membrane. Attempts at immediate closure should not be made until one is certain that there are no foreign bodies remaining, such as tooth and bridge fragments, or similar débris. Several months ago, a patient was seen who five days previously had, while driving, collided with a safety zone, his head striking the upper part of the steering column. All the upper right teeth were lost, as well as the inferior and lateral walls of the antrum. There was a profuse discharge and examination showed a metallic looking object against the orbital floor which proved to be the horn button. There was a fracture of the inferior surface of the orbit, the button having penetrated more than 1 cm.

CHRONIC MOUTH INVOLVEMENT

In the presence of an unhealed antral-oral fistula, the mouth is in constant communication with the antrum and indirectly with the nose. In old cases of this kind, the opening decreases, but complete closure does not take place. The fistulous canal becomes lined with mucous membrane and remains in that state. Such a condition results from certain technics for antral treatment. The vulcanite plug

was a familiar finding, a flattened surface in the mouth with a columnar projection extending into the sinus cavity. We can remember the type of mucus that bathed the upper portion, a semipurulent discharge, partly the result of irritation by the foreign body, combined with nasal secretion. Fortunately, the advocates of such practice are rare now, but the root-socket opening lays the groundwork for such delayed healing.

Root-end infection near the inferior surface of the antrum should be carefully eliminated at the time of extraction. If, inadvertently, this remains,

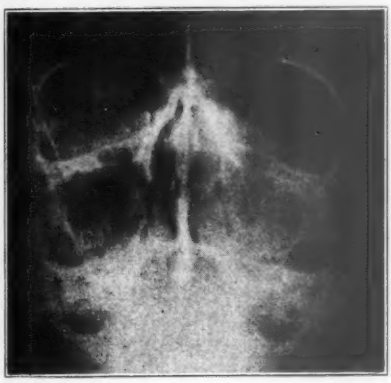

Fig. 5.—Cloudy shadow of right maxillary sinus, indicating presence of fluid or extensive polyp formation.

there is continued irritation and consequent injury, which results in more bone destruction or degenerative disease of the antral lining. Intra-oral roentgenograms are usually negative and, because of absence of fluid, the anteroposterior view is likewise. The only subjective symptoms are indefinite discomfort and some tenderness above the alveolar process. When such an antrum is opened, varying degrees of damage are revealed, depending on the chronicity of the condition.

Enough destruction of the membrane may take place to cause serious hemorrhage. Recently, a patient was seen who, five weeks before, had an upper third-molar root extracted. The task was difficult, and when it was completed, the socket led directly into the antrum. Soon after this, severe intermittent bleeding began, which twice led to hospitalization. On a third occasion, the patient was in the hospital, this time pulseless, with extreme pallor, and near death from loss of blood. She had undergone transfusion (500 c.c.) and was receiving excellent supportive care, but continued to lose ground. Packing the antrum with gauze through the

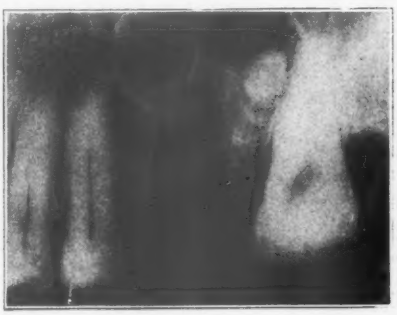

Fig. 6.—Typical view of root forced into antrum during extraction. The fragment lies in a depression just mesiad from the second molar roots.

tooth socket was also ineffectual. Examination of the antrum through a window in the maxillary wall showed extensive destruction of the lining membrane, especially from the tooth socket up to the posterior blood supply. There were also many polypoid growths. Curettement and packing controlled the hemorrhage and made rapid recovery possible. It is probable that this bleeding was caused by necrosis of the blood vessel walls and that removal of the infected membrane prevented further destruction.

TREATMENT

When opening the antrum becomes necessary, a method must be followed which will give satisfactory access and yet will permit the sinus to function again as an accessory air space, but not as a short cut between the nose and the mouth. A window in the lateral wall of the maxilla provides a practical means of this and, when it is properly placed, an excellent view of the entire cavity is possible. Of equal importance, the end-result is good. The soft tissues approximate along the line of incision and heal rapidly, and there is no injury to adjacent structures.

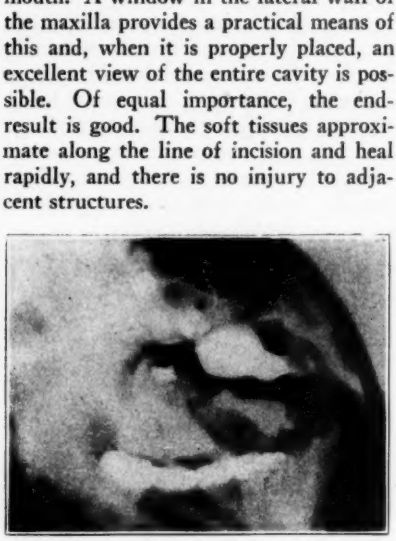

Fig. 7.—Floor and walls of right maxillary sinus destroyed by foreign body, an automobile horn button having been driven through. The object is shown here lying against the orbital floor, which has been penetrated by the trauma. There are fragments of porcelain bridgework present.

The work is done under block anesthesia, with the following injections: an infra-orbital at the completion of which the needle is partly withdrawn and redirected at the junction of the nasal bone with the nasal cartilage to reach the nasal branch of the anterior-superior dental nerve; a tuberosity injection; an anterior and posterior palatine, and a few drops along the proposed line of incision to control bleeding.

The roentgenogram is studied carefully to determine the size and position of the antrum. A horizontal incision is then made above the root-ends at the attachment of the zygomatic bone anteriorly for 4 or 5 cm. The periosteum is reflected upward only, the bony surface, which is penetrated by a small chisel or trochar, being exposed. A small section of the wall is removed and the opening is enlarged with a rongeur. If the problem is the removal of a root fragment, this is accomplished in a very few minutes. The flap is returned to position, and the antrum is thus protected from mouth contamination. If the lower border of the

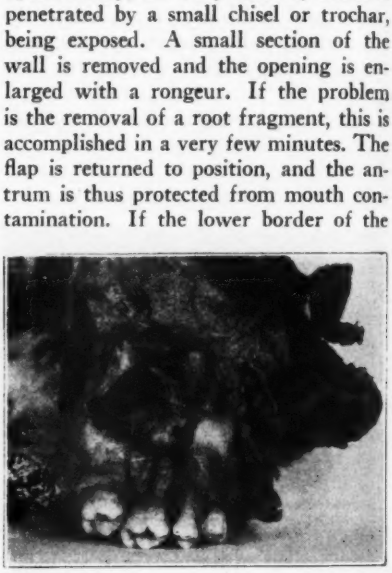

Fig. 8.—Lateral wall of maxilla removed to show proximity of first molar root ends to antral floor; junction of root ends and sinus floor.

incision has not been disturbed, the tissues will approximate, with no need of sutures, and a faint scar only will remain after healing.

If the antrum contains polypoid formations, all such degenerated areas should be removed. The most frequent site of these is the floor, where perforating root tips cause irritation, and at the anterior angle between the nasal and the lateral walls. Following the extraction of a badly diseased communicating upper molar or an upper third molar, where the

root end had extended through the floor, its removal leaving an opening, there may be an acute flare up within the antrum resulting in the formation of a foul purulent material, which discharges through the ostium and also into the mouth. Previous to actual pus formation, the patient usually complains of tenderness and a feeling of discomfort above the alveolar process caused by inflammation of the lining membrane. Then when the discharge begins, there is pressure, because drainage is inadequate. At each step, the adjacent upper teeth feel elongated and tender, the eye on the affected side may seem to protrude and, when the head is thrown forward, the presence of fluid within the cavity is very evident. Satisfactory treatment may require opening the antrum from the mouth.

Fig. 9.—Inflamed, hypertrophied turbinate bones preventing proper function of ostium maxillaris. An antral-oral opening is difficult to close in the face of such a complication.

Polypoid growth and other disease around the antral-oral opening delays healing and, if not eliminated, may be the source of chronic maxillary sinus disease. If, to afford the patient relief during the acute distress, an antrotomy only is performed, this should be followed later by an examination of the antral content through a window in the lateral wall. The nasal opening is valuable in increasing ventilation and may be necessary in the procedure of closing an old chronic fistula, but alone it is not sufficient. In other words, antral disease of dental origin requires further treatment which permits clear vision of and access to the sinus portion of the mouth opening. Such cases do not require extensive denuding of the membrane from the walls, but they may need curettement around the point of perforation, and if this is not done when needed, the mouth opening persists unnecessarily and a diseased condition of the antrum results.

The antrum should not be opened without sufficient reason. Not long ago, puncture of both antrums was routine practice for some in an examination of the sinuses, but this has been discontinued from a realization that infection may be introduced. The fact remains that, when necessary, access may be gained through an opening which permits one to do the necessary work and yet is readily repaired.

Fig. 10.—Normal turbinates permitting adequate aeration and drainage of antrum.

CHRONIC ANTRAL-ORAL FISTULA

Occasionally, we see an opening of long standing leading from the mouth into the antrum and with it may come a history of one or more unsuccessful attempts to

make it heal. The efforts which fail usually depend on a palatal flap, which is lifted and transposed to cover the fistula. There are usually two factors in a failure: the blood supply and tension on the flap. The palatal gingiva in the molar region does not have a rich vascularity, and the shallowness of the tissues under suture pressure causes tension. After a few days, the little plastic effort that seemed so encouraging is doomed. The flap dies and sloughs away and the opening reappears.

The requirements for such a transplant are conveniently nearby in the buccal tissues. An elliptic incision, made at a point determined by forcing the cheek inward to approximate the opening, is carried down to the buccal fat. The tissue is reflected inferiorly and, after removal of the mucous membrane around the fistula, is sutured firmly over it. The entire mass may not become attached, but much of it will, and a second operation is usually sufficient. This binds the cheek down tightly to the alveolar ridge and prevents the insertion of any restorative work, as well as causing an impediment in opening the mouth. After the new growth is well established, the attachment is incised, and if the new surfaces are cauterized and the patient is instructed to push the cheek away with the tongue, a normal condition soon returns. Failure may be met here as well, if nasal congestion prevents proper functioning of the ostium with consequent drainage into the mouth. A new route must be established, and this is best accomplished by means of a small window in the inferior meatus, which furnishes the necessary ventilation.

Fig. 11.—Osteomyelitis of right maxilla penetrating face through infra-orbital ridge. A diseased deciduous tooth originated the destructive process, which involved the antrum and finally made its exit at the point shown.

CONCLUSIONS

Clinical findings show that the bony floor of the maxillary sinus may become necrotic and that the mucous membrane covering it is subject to degeneration and destruction by infection transmitted by diseased upper teeth the roots of which extend into, or nearly into, this cavity. When such a condition is discovered during extraction, the removal of degenerated tissues should take place through a window created for this purpose and not through an enlarged tooth socket, and this applies likewise to the recovery of fractured root tips which have been pushed through the floor. The natural opening for the antrum of Highmore is into the nose, and if a surgical operation is necessary because of dental infection, the communication with the mouth must be limited to the operative period.

If postoperative irrigation is required, it should be carried out through an artificial opening in the nasal wall. An oxidizing solution is desirable because the growth of some of the organisms may be favored by reduction of the oxygen supply. The occasional use of a dilute tincture of an efficient germicide is stimulating to the membrane. The procedure as outlined rapidly clears up an antrum damaged by dental infection and avoids the delay and complications arising from

an approach through the alveolar process.

1649 David Whitney Building.

DISCUSSION

E. C. Hume, Louisville, Ky.: Do you advise the removal of the tuberosity in all instances when it is broken off the maxilla in the removing of teeth? Why are the various injections advised in preference to the second division block? What is the advantage of the horizontal incision over an incision made at the free gum margin for opening into the sinus? What advantage, if any, has the operative procedure which you advise over the Caldwell-Luc operation? Do you feel that chronic maxillary sinusitis belongs to the field of the exodontist and oral surgeon? What is the advantage of using a flap from the buccal tissue instead of using tissue from the palatal surface in closing the opening into the sinus?

Dr. Christiansen: I do not advise removing the tuberosity when it is fractured during the extraction of posterior teeth if, by proper suturing of the soft tissues, the fragment can be maintained in position to permit reattachment. If the injury is too severe, the fractured portion should be removed by careful dissection rather than to wait for slow sequestration, a very unpleasant ordeal for the patient. Excessive lateral pressure in extracting upper molar teeth is hazardous because of the danger of this accident. One should be sure that any movement there is is of the tooth, and not the antral floor, so that the force may be stopped immediately if necessary. If anesthesia could always be obtained from an injection in the sphenomaxillary fossa, this method would be ideal, but I have not had that success. If further injecting is necessary, why not use the more simple procedure in the beginning? If after opening the antrum and examining its contents, one decides that additional nasal ventilation will be necessary, a small tampon of cotton wet with 10 per cent solution of cocaine hydrochloride should be placed under the inferior turbinate to insure anesthesia of that portion of the naso-antral wall. The purpose of making the incision high is to insure healing of the window. A low opening, particularly in an edentulous mouth, might result in an antro-oral fistula which would be very difficult to close. The incision is made essentially by the Caldwell-Luc oral technic, and I believe should extend well posteriorly to provide an opening which will permit proper access to the antrum, regardless of its size. The decision as to how maxillary sinusitis should be treated, depends, as I have said, on the findings. If there is nasal and adjacent sinus disease, the responsibility is not ours. If the cause is directly attributable to oral infection, we should treat the condition and not send the patient elsewhere. The rhinologist does not always welcome such a referred case and one cannot blame him. Healing may be slow and cooperation of the patient is frequently lacking. I have found the use of a buccal rather than a palatal flap desirable in cases of large fistulous openings, for two reasons: (1) the former has a much richer blood supply and hence failure from sloughing is less frequent and (2) much less soreness is encountered in the cheek than in the palate.

ORAL MANIFESTATIONS OF BLOOD DISEASES*

By CHARLES H. WATKINS, M.D., Rochester, Minn.

As many of the blood dyscrasias present their earliest signs in the mucous membranes of the mouth, it is very important that the dental profession recognize these early signs, for many of these conditions may be cured if recognized in their early stages, and operative procedures should not be carried out in cases in which disease of serious prognosis is present.

Anemia presents changes, as a rule, that may be recognized by the pallor of the mucous membrane. Secondary anemia usually presents no oral changes aside from pallor, although evidence of malnutrition may be noted by the condition of the teeth and alveolar processes. In cases in which the patient appears to be anemic, it is well to question him in regard to his diet, and as to whether there has been any loss of weight (suspected malignancy) or any evidence of chronic loss of blood. Many times, the earliest sign of malignancy in the stomach is an anemia which may be recognized by the dentist. In such cases, the patient should have a blood count and, if the symptoms warrant, a complete examination by a competent physician.

One of the outstanding clinical features of pernicious anemia is glossitis, or sore tongue. This may occur before there is much anemia and before any of the neurologic changes and peripheral evidences of subacute combined sclerosis are present. The tongue generally is thickened, there is atrophy of the mucous membrane and the general appearance is that of raw beefsteak, the so-called beefsteak tongue of pernicious anemia. As a rule, the irritation is confined to the tongue itself. There are many cases of idiopathic glossitis, but in these there is usually no atrophy of the mucous membrane of the tongue and there generally is irritation of all portions of the mucous membranes of the mouth. The skin of the body is generally lemon yellow when the anemia is severe, and the patient complains of numbness and tingling in the fingers and toes. There is oftentimes difficulty in walking, and in using the fingers, particularly to button clothes. With this syndrome, one should suspect pernicious anemia, and the patient should be referred to a physician for adequate treatment, for the earlier pernicious anemia is treated the more likely one is to prevent serious neurologic injury.

Of more importance to dentists are the hemorrhagic diatheses. Since, in all of these conditions, bleeding is a predominant factor, a history of bleeding should always receive careful consideration. The four conditions which are most likely to produce bleeding are: essential thrombocytopenic purpura, aplastic anemia, acute leukemia and hemophilia. Essential thrombocytopenic purpura, as a rule, presents a history of petechial hemorrhages over the body and in the mucous membrane of the mouth, and of prolonged bleeding after small cuts, particularly

*From the Division of Medicine, The Mayo Clinic.

*Read at the Sixteenth Annual Meeting of the American Society of Exodontists and Oral Surgeons, Rochester, Minn., Aug. 2, 1934.

after tonsillectomy or the extraction of teeth. In contrast to this, aplastic anemia is generally a progressively advancing disease, the patient becoming more and more anemic. The tendency to bleed does not occur until the anemia is severe. No form of treatment has proved of benefit in this condition. Acute leukemia, as a rule, is fairly rapid in onset. Bleeding may occur very early in the condition, even before much anemia is present and, as the disease is always fatal, as little as possible should be done in the nature of any operative procedure. The differential diagnosis of these three conditions, of course, rests primarily on the laboratory findings. The bleeding time is prolonged, the coagulation time of the venous blood is, as a rule, normal, the retractility of the clot is markedly prolonged and the leukocyte count is generally under 10,000, except in some forms of acute leukemia, in which the leukocyte count may be high; although in approximately 40 per cent of the cases of acute leukemia seen at The Mayo Clinic, the leukocyte count has been less than 10,000 per cubic millimeter.

In essential thrombocytopenic purpura, the spleen is generally enlarged, although not markedly so, and there is normal bone-marrow regeneration. In general, the bone marrow is hyperactive in an effort to compensate for the loss of blood; whereas, in aplastic anemia, the spleen is rarely if ever enlarged. The bone marrow is hypoplastic, there being evidence of decreased blood regeneration, and the condition is rarely cyclic, as is the case with true purpura.

Acute leukemia is a progressive, fatal disease without the occurrence of remissions, and it may be distinguished from the other diseases by a morphologic examination of blood smears, by which immature cells of the leukocytic series are found. In the differential diagnosis of these conditions, therefore, a morphologic examination of the blood is essential. In aplastic anemia, there is but little or no evidence of regenerative activity in the bone marrow; in thrombocytopenic purpura, there is increased regeneration of the bone marrow with decreased blood platelets, and in acute leukemia, definitely immature cells of the leukocyte series are present.

Hemophilia must also be considered, but, since this is a disease generally confined to the male and transmitted by the female, and since there is a history of joint hemorrhage over a number of years, the condition may be eliminated from the diagnosis. The laboratory findings in hemophilia are quite characteristic, namely, a normal platelet count, a normal leukocyte count, a normal differential percentage, definite evidence of regeneration of erythrocytes, normal or only slightly prolonged bleeding time, normal retractility of the clot, markedly prolonged clotting of the venous blood and prolonged thrombogen time. In all of these conditions, extraction of teeth, or any other operative procedure on the mouth, is accompanied by grave risk and should not be undertaken until a definite diagnosis has been established.

There is one other condition that is probably more important than any of these: agranulocytosis or malignant neutropenia. Only fairly recently has this condition been recognized as a disease entity, and the earliest symptoms, as a rule, appear in the mouth. The first sign of the disease is a complaint by the patient of difficulty in swallowing, not due to soreness of the throat, but rather to tenderness along the sides of the neck. This probably is due to pressure on cervical lymph nodes during the process of swallowing. About twelve hours later, the patient complains of fever and of soreness of the mouth. On examination,

necrotic ulcers are found along the margins of the gums. These ulcers may be spread over the entire oral mucosa, extending back into the pharynx and even down into the larynx and trachea. The ulcers appear after the leukocytes have markedly decreased in number, since they are due to saprophytic bacteria in the mouth and throat which have been held in check by normal leukocytic resistance.

Therefore, a leukocyte count should be made in all cases at the first sign of any evidence of ulceration in the mouth or of any difficulty in swallowing. The blood findings are quite characteristic: There is a marked decrease in the total leukocyte count. The percentage of neutrophils is markedly decreased. Usually, they are totally absent, as are also the other granular leukocytes, the only cells found being small lymphocytes. The erythrocyte count and the percentage of hemoglobin are normal. This feature is so constant that an anemia with a low leukocyte count practically always eliminates agranulocytosis from the differential diagnosis. This disease is usually fatal unless treatment is given, and even then, if it is not administered sufficiently early, the prognosis is extremely grave. The differential diagnosis is usually between Vincent's angina, septic sore throat and ulceration of acute leukemia. In these conditions, in contrast to agranulocytosis, the leukocyte count is generally normal or above normal, but, in some forms of leukemia, the leukocyte count is low. The diagnosis of leukemia is suggested by the associated anemia and is verified by finding immature leukocytes on morphologic examination of the blood. In septic sore throat, there is leukocytosis, and in Vincent's angina, leukocytosis is generally present, the organism being found in smears made from material obtained from the ulcerated areas.

The etiology of agranulocytosis is a moot question at present. There is a good deal of evidence that amidopyrine and compounds containing this drug, as well as derivatives of barbituric acid, may be an important factor in producing the condition among certain persons who may have an idiosyncrasy to these drugs. For any person who presents a history of fever and of sore throat while using any of these drugs, or in a similar case in which their use is contemplated, a blood count should be made to ascertain whether the blood is normal. No patient should be given such preparations as a routine procedure without frequent blood counts to determine whether the idiosyncrasy is present.

As far as treatment is concerned, several procedures have been recommended. As treatment depends on early recognition of the disease, this fact must be stressed first. The consensus of opinion at present is that probably, in the intial attack, pentnucleotide is of value if given intramuscularly in a dose of from 10 to 20 c.c. daily until the blood count becomes normal. Exposure of the long bones to the roentgen rays, transfusions and administration of adenine sulphate, nucleic extract, copper and iron preparations and liver extract, intramuscularly or intravenously, have been suggested, but at the clinic these have not been found to give satisfactory results. I have used a preparation of bone marrow in a dose of from 150 to 300 grains (9.75 to 19.5 gm.) daily by mouth with quite satisfactory results. The response is obtained on the average in from twenty-four to thirty-six hours after the initial dose has been administered. It must be stressed that early diagnosis is imperative and, if the patient is to recover, the earlier the diagnosis is made, the greater opportunity there will be for adequate treatment. It must be borne in mind also that, even under the most ad-

vantageous circumstances, the mortality rate from this disease is quite high.

SUMMARY

Since many of the blood dyscrasias present oral manifestations as early signs of the disease, and as treatment produces the best results when instituted early, members of the dental profession should keep such diseases in mind in order to render the best service to their patients.

EDITORIAL WRITING*

By HERBERT LEFKOVITZ,† St. Paul, Minn.

EDITORIAL writing is a subject that presents at this moment in world affairs an issue which is one of the most vital and most laden with consequences for the future good or evil of the world, and which is not of less importance to you or to the general public than it is to newspapermen.

The question at issue is, shall democracy and human liberties sanctified by the blood of the martyrs of freedom persist, or shall the human race be subjected again to the autocracy of dictatorship? The foundations of our national greatness are fastened on individual liberties. The fame of our national heroes rests on their great and devoted service in establishing those liberties.

The cornerstone of human freedom and the democratic system of individualism is freedom of the press, which is one aspect of freedom of thought, speech and conscience. No man is really free who may not profess whatever religion he wishes, and hold and express whatever ideas he holds on political, economic and other matters. No nation is free wherein its citizens are compelled not only to obey as commanded, but also to speak as commanded. The free press is crucial. When the ruler may not be criticized, when the powers in authority may dictate what the people shall learn and think about their own affairs, that nation is in the grip of autocracy, and of this system, press censorship is the keystone, just as the free press is the keystone of democracy.

Lest you may think that nothing so grotesque as this suppression of human liberty is a present danger to the human race, may I remind you that of the great powers of the world, only France, England and the United States today maintain a really free press. The spirit of dictatorship is abroad, conjured up by years of hardship, maladjustments, sufferings which have made people an easy prey to the alluring promises of demagogues of any color or kind, who, catching to some slogan or grievance, can promise the millennium if only given absolute power to enforce their particular shibboleth.

But before I speak further on this very real threat, from which even our own country has not been completely spared, I wish to talk of the function of the editorial columns of a newspaper in somewhat greater detail.

The function of the editorial columns

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†Editor, St. Paul Dispatch.

is threefold: First, in those columns, the newspaper expresses its own convictions on public matters. Secondly, the newspaper reflects in general the broad viewpoint of that section of the country which it serves, and thus mirrors public opinion as well as helps to create it. Thirdly, the newspaper through its editorials strives to elucidate and clarify the elements of complex political and economic questions in a manner not possible in the news columns so that its readers may be aided in coming to an intelligent opinion for themselves.

The function of expressing an opinion in the press was originally confused and intermingled with the factual presentation of news. The newspaper really began as a journal of opinion. The concept of the press as a vehicle of public information is an advanced, progressive, modern one. It is in keeping with the scientific and objective spirit of the times that saw the rise of the modern newspaper. It is much easier to report the personal view of events and situations than it is to eliminate prejudices and present merely fact. Facts are hard to determine; opinions are easy, though there is nothing so difficult, nothing calling for so much trained ability and knowledge, and therefore nothing so rare as the formation of sound, competent opinion on human affairs. It is interesting to recall that the editorials of the first modern newspapers were called "leaders"; that is, leading articles. The leaders were no different in method from the other articles in the newspapers. All were personal and opinionated accounts of the news. The leaders were simply those articles which dealt with the most important subjects of the day's news, were written by the editor and his chief subeditors, and, therefore, were given a special position and display. The leaders of the *London Times*, in the mid-nineteenth century, which were the forerunners of modern editorials, exerted great influence in England and on the Continent, because they were written by the great editor Delane, and because they were known both to reflect the opinions of the British government and to give shape to those opinions.

The conditions under which the American metropolitan press developed gave rise to the concept that the function of the newspaper should be a factual recital of the news, with the opinion of the editor confined to the leaders, which became known as editorials and were placed apart on a special page. It was a necessary and highly successful compromise. It may be possible to report some kinds of facts without having an opinion or point of view toward them. But sociologic, economic and political events are not quite in the same category as the data of the physical sciences. It is impossible for an intelligent individual, or staff of editors, to participate in the world of action without bringing to bear some standards of judgment on those matters which are observed and reported. A newspaper which claims to have an opinion is either a humbug or a nonentity. A vigorous, unafraid, upright, well-informed and soundly advised editorial page is the sign of a healthy newspaper.

But the editorial page does not merely express the individuality of the newspaper. It must have its roots in the soil from which it springs. It must be part and parcel of its place. A newspaper in an agricultural region which does not have the interest of agriculture at heart would be a monstrosity, a journalistic freak. I do not mean in the slightest that a newspaper must slavishly parrot the opinions which it judges to be most popular and so curry favor at no matter what expense to conscience and rectitude. Such newspapers exist and will usually be found pandering to the basest emotions

of the human race. A newspaper must have a mind of its own, if it is to serve its function, and it must assert these opinions regardless of the ill will it may thereby create among thoughtless, shallow persons. The function of a newspaper is to protest against the follies of majorities just as stoutly as against those of minorities. It should be as ready to expose an unworthy motive when it is embraced by the multitude as it is to expose the corruption of an individual. But, to be a solid entity, it must stand for something and that something most useful is the ascending welfare of city, region and nation. A newspaper in St. Paul must represent America before the world and the Northwest and St. Paul before America.

The third function of the editorial page is to expound or to elucidate the current events of the world. This, a comparatively recent addition to the functions of editorials, has arisen partly because of the decline of taste for highly personal, opinionated diatribes, and partly because of the increasing complexity of questions which the people are called on, with extension of democratic processes, to judge. Consider for example such a question as monetary reform. It is easy to call any one who would depart from the gold standard dishonest, and many were so called during the money controversy in 1896. But calling a man dishonest does not explain the problem of money, and I believe that, in the money reforms of 1933, the press quite generally was exceedingly anxious to place before their readers all the elements of this very difficult subject and to explain as best they could the facts and theories which lay behind the various proposals and actions.

Or consider the war debts! President Coolidge is reputed to have once said, "Well, they hired the money, didn't they?" It is very simple for a trained editorial writer to pound out editorial after editorial, whenever a new phase of the question arises, by simply ringing in the changes on that simple thesis of President Coolidge. But, after all, when you have asked that apparently profound question, you have really said little about the war debts or presented anything that would lead your readers to understand the exceedingly intricate and involved mass of rights and wrongs which are the war debts. The informative editorial is playing an important part in the development of editorial writing, and it is far from being the least valuable of the functions of the page. There may or may not be considerable opinion also present in such an editorial, but usually the opinion is segregated and given as a conclusion from which the reader, if he is independent in the formation of opinions, is easily able to dissent on the basis of the same facts as those employed by the editor.

These, then, are the three functions of the editorial: to guide public opinion, to mirror public opinion and to elucidate complicated questions on which the public needs to form opinions. The present period of disorder and difficulty has seen a great rise of interest in the editorial page, and naturally so. When conditions are smooth and every one is content very largely with things as they are, the people are little concerned with passing judgment or seeking explanations. They are too comfortable to feel the need of stirring. But when their complacency has been jarred, they wish to know what has happened and why and how the difficulties can be mended. Then they become editorial readers.

But the whole value of the editorial page, and indeed the function of the editorial, depends on the freedom of the editorial staff to come to its honest conclusions without outside interference and

dictation. There are few persons in authority who really welcome criticism, even the most obviously constructive criticism, although most of them profess to welcome it. It is due to this natural human weakness, the desire of a man in power to stay in power, that the freedom of the press is constantly in danger. In the United States, thanks to our constitutional guarantees, there is very little that the most restive of would-be suppressors of the free press can do about it, but that does not prevent some of them from trying. In Minnesota a few years ago, we had a newspaper gag-law, which on the surface was intended for suppression of scandal sheets, but which was so framed that it might have been used to suppress any newspaper whatsoever which might happen to offend an official who could get the friendly action of any single judge. The United States Supreme Court invalidated that law as an infraction of freedom of the press. Within the past two weeks, strike disorders led our governor to declare martial law in Minneapolis; and naturally one of the first decrees handed down by the military dictatorship was a regulation commanding the newspapers published in that city or circulating there not to publish anything that this same dictatorship might define as a defamation of the state or a criticism of the military authority, subject to whatever arbitrary punishment the military dictatorship might wish to impose for violation.

There have been three or four threats in recent years in Washington against freedom of the press in America, arising, I believe, more from a mistaken notion than from any deliberate antagonism to freedom of the press. There are undeniably abuses of the privilege of freedom of the press, and occasionally an official with an imperfect appreciation of the overwhelming importance of preserving human liberty allows his zeal for correction of those abuses to misguide his judgment as to the method he employs. I should like to mention the controversy of a year ago between the newspaper publishers and General Johnson over inclusion of a specific section in the code saving the point of freedom of the press. The publishers feared that at some time in the future some arrogant official might use the threat of suppression as a club to control editorial opinion or to say what should or should not go into the columns. General Johnson said the reservation was unnecessary, but the publishers wished to be on the safe side and General Johnson yielded. Later, the government attorneys in the Weirton Steel Case argued that the defendant could not plead the defense of constitutional rights because he had waived them in signing the code contract. And, what is more interesting and pleasant to record, General Johnson himself, in his famous speech at Waterloo, Iowa, in which he spoke of his horror at the Nazi executions in the affairs of June 30, most graciously confessed error, saying: "For a long while, I thought sincerely that the newspapers' insistence on writing into their code a clause saving their constitutional rights was surplusage—but I now see more clearly why these gentlemen were apprehensive."

I have just mentioned the German dictatorship, which, like that in Russia, has freed itself from any adverse criticism at home by the simple expedient of censoring the press and thus preventing all but the most favorable news and opinions from reaching the German people. Is it not most significant that Von Papen, in his very courageous address ten days before the bloody suppressions, and which nearly cost him his life in that terror, made the suppression of the free press one of his principal attacks on "Hitlerism"? "The press," he said, "is no longer a

safety valve." He continued, "The real purpose of the press would seem to be to inform the government of defects that have crept in and point out where corruption has secured a berth, where serious mistakes have been made, where unfit men have been put in wrong places and where sins are being committed against the spirit of the German revolution. An anonymous or secret intelligence service, be it ever so excellently organized, can never be a substitute for this task of the press."

Von Papen's remarks are by no means a complete statement of the necessity for preserving freedom of the press, possibly for very understandable reasons. He might have gone a great deal farther and said that a free press performs the function not merely of informing the government of such evils as he mentioned, but also of informing the people of defects in the government itself. But, if he had done that, possibly he would not be alive now to fight again another day.

I believe that there is no right which must be protected from the untender mercies of dictatorship inclined autocrats more than this right of freedom of the press. Without it, all other liberties must finally perish. Without it, government is irresponsible, the people are enchained and the most horrible tyrannies can become entrenched. I came to speak to you about editorial writing. I find I have really spoken to you about that which is far more important, the very freedom of your generation and all the generations to come. To create this freedom, our forefathers fought. It is now our privilege and duty to fight, if necessary, to preserve it.

DENTAL THERAPEUTICS AND DENTAL JOURNALISM*

By HAROLD S. SMITH, D.D.S., Chicago, Ill.

EDITORS, contributors and readers form the tripod on which all journalism rests. Readers must be interested; editors and contributors should be interesting. The dental reader should be expected to be interested only when the pages of the publication are devoted to his interests. This applies to the advertising as well as to the literary pages.

The relationship between the literary department and the advertising department of a medical journal was recognized as far back as 1847 by the "Autocrat of the Breakfast Table," who wrote as chairman of a committee on medical literature. Dr. Oliver Wendell Holmes wrote in part:

> Some principle, in addition to the wants of the reading community, must exist to account for such inordinate fecundity in this particular department. This is to be found in the homely fact that a medical journal is a convenient ally and advertising medium for public institutions and publishing establishments.

This homely fact was recognized by many who saw in medicine and dentistry an opportunity to convert the reading desires of the members of the profession to their profit.

Thus, prior to 1900, there had sprung up in this country a large number of so-called medical journals which used this

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interest of their readers as a cloak for financial returns from the advertisement of proprietary remedies. Indeed, the growth of these mushroom journals was coincident with the rise of the patent medicine and proprietary medicine industries.

These journals flourished until the first years of this century. To be sure, protests were raised by medical organizations against this commercial domination of therapeutics; but to no avail.

In 1900, there came on the scene an editor who for twenty-five years devoted himself whole-heartedly to the promotion of honest medical journalism, from which much can be learned. George H. Simmons has been rightfully called the greatest medical journalist in medical history. The main objects to which Dr. Simmons devoted himself and the *Journal of the American Medical Association,* which up to that time had been as guilty as others in its acceptance of advertising for patent medicine and worthless proprietaries, were (1) the establishing of state examining bodies to act as licensing boards in place of proprietary diploma granting medical schools; (2) the improvement of medical education by the raising of preliminary requirements and lengthening of the course, and (3) the regulation of pharmaceutic matters and of patent and proprietary medicines. It is the last of these three objects that concerns us.

To return to the tripod upon which journalism rests: It is the duty of editors to fight ignorance, quackery and fraud, not by a campaign of silence but openly, militantly and continuously. Contributors ignore their duty when submitting papers to those publications in which the products of their brains will be permanently associated with advertising that victimizes their fellow practitioners. Readers, the most important part of the tripod, can assist the editor and the contributor in moments of weakness, if there be such, by purchasing only approved products of merit, advertised in sound publications.

There is a relationship between dental therapeutics and dental journalism. There are two ways of introducing products for therapeutic use to the profession. One is the preparation of a dignified, scholarly, nonsecret report for an approved journal. The other consists in putting out a reputed discovery under a proprietary name, with the connivance of an editor of a trade journal, who writes an article in praise of the product. At the same time, it is expected that a page or two in the advertising section of that journal will be purchased.

It is clear who pays the cost. Compare, for example, the introduction of Dr. Howe's method of preparing and using ammoniacal silver nitrate with the introduction of Wondrpak, Fantazn, Sensitex, to mention only a few of the products discussed by the Council on Dental Therapeutics. Indeed, there is now on the desk of the secretary of the Council, a letter which illustrates in some measures this tendency. The letter reads in part as follows:

> The products we are planning to market are a liquid germicide of two-strengths—one for treatment of gingivitis, Vincent's and pyorrhea, and the other for dipping scaling instruments into. We also would appreciate your advertising rates for both display advertising and for story where the worthiness of the merchandise would be set forth in an article.

Advertising plays a large and prominent part in the publication of many scientific periodicals, particularly in those which go to members of the healing arts. Honest advertising may at times be as instructive as the reading page. What shall be thought of those journals which are published not in their readers' interest

but primarily as a business venture, the acceptance of advertising being conditioned only by the ability of the firm to pay its advertising bill? Contrast such an attitude with the attitude set up by THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION that no advertising for proprietary products shall be accepted, unless the product has been favorably passed on by a body competent to evaluate the product in the light of a published set of rules.

These journals which come to you free, and which, as already mentioned, represent advertising schemes and are organized with a view to profit, sometimes baldly so, and other times under a shroud provided by an editorial board, are the light reading matter of dentists. They contain no serious matter. The literary pages are merely the cloak to inveigle the dentist into reading the lurid advertising pages from whence the main income is derived. A glance at these pages reveals to the initiated that many dentists are being asked to part with their money for worthless, unessential and, in some cases, harmful products which, if the composition were known and they were sold according to an acceptable basis of discrimination, could be duplicated by the dentist, if he so desired, at little cost. In some cases, the dentist would not consider using them or countenance his patients' use of them.

It may be argued that the cost of the product may be only a few dollars, but what of the apparatus used for therapeutic purposes that sells up to $200, $250 or more? What of the advertisements inducing dentists to buy ultraviolet light machines for the treatment of pyorrhea and other oral diseases? What of a newly advertised machine for administering mixtures of anesthetic gases? From the history, it is apparent that these advertisements were accepted not on the basis of a searching investigation by the editors of many journals, but from a willingness on the part of the business department to add to their advertising income. This brings us to the core of our problem.

Just as the literary pages mirror our standards, so does the character of the advertising in professional journals reflect their standards. Let us face this problem with a series of questions:

What, for example, are the standards of those dental journals that defile the confidence of their readers in their advertising? What shall we think of a so-called professional journal that plays on its readers' confidence and persuades them to purchase 50 cents worth of zinc oxide for $72, under a proprietary name? Or of those that advertise hydrochloric acid under a proprietary name at an exorbitant price as a stain and tartar remover? What of those journals which accept advertising that makes the dentist the victim of new therapeutic remedies whose usefulness has not been subjected to the fire of critical judgment? In this respect, THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION and the Council on Dental Therapeutics have taken the lead. The path before them is a hard one, but the progress in the last five years indicates solution of the problem, not by compromise but by meeting issues as suggested at the beginning of this paper.

It has been aptly said that the drugs, with few exceptions, that are needed for the intelligent practice of dentistry, are listed in the U. S. Pharmacopeia or possibly the National Formulary. But a glance at the advertising pages of only a few years ago, and even of today, reveals a different situation. This situation troubled serious dental thinkers from the earliest days of dentistry. For example, one reads the protests of the American Dental Association, in 1867, of the Mas-

sachusetts State Dental Society against this type of exploitation, but the protests did not bear fruit until the A.D.A. Bureau of Chemistry was formed (1928), and the Council on Dental Therapeutics was appointed (1930).

These two bodies, for the first time in the history of dentistry, frankly discussed this situation so closely bound up with every phase of dental practice. By weight of fact and frank statements, they pointed out the situation confronting the dentist. Little progress would have been made were it not for the fact that their reports appeared in the official organ of dentistry, THE JOURNAL. Dr. Johnson, the Editor, has been cooperative in giving space for these reports, and his recent editorials in behalf of the aims of the Council inform the reader of the progress being made. It is only by publicity of the findings of these bodies that progress can be made. These statements of the Council and the Bureau of Chemistry need constant reiteration to the busy dentist.

The American Association of Dental Editors represents a real stage from which the program can be made more effective. There are in the Association at the present time about forty state and local journals. Their objectives are devoted to the highest aims of dental journalism. Some expressions on the status of journalism indicate that they will not be found wanting.

Until recently, the secretary of the Council has been supplying abstracts of the Council's reports for republication. Many editors have given valuable space to these abstracts, and some editors were actually distressed when the service was interrupted, primarily for financial reasons. It is hoped to resume this service as soon as the funds and personnel of the Council permit. I should like to point out to you that this project was a wholly voluntary one on the part of the secretary of the Council, and, in the early days, much of the material for these abstracts was written after the usual day's work; but devotion to a cause means ignoring the clock.

This is not enough: the editorial voices of the members of the American Association of Dental Editors should be raised against subversive practices. What of the trade journal which is nothing more than an advertising medium? What of the commercial clinics conducted by master showmen to sell the "newest" remedy for this or that? Shall the editorial pages be silent when the commercial exhibits of their societies admit unacceptable products, not to mention nostrums, because the income derived therefrom helps to run the meeting? Shall our editorial pages be silent when these practices exploit our confidence and sometimes undermine our patients' health? Shall the editorial pages deal with generalities about ethics, when dentists, even members of their own society, propose to carry their names to posterity on a package of toothpaste, toothpowder or some dental nostrum? Or shall they raise their voices against this practice? The editor of a journal, while part of the society, must hold himself apart from it so that he can consider these problems from their long range aspect. His voice should be raised when our therapeutics is being debauched as it is by some of the practices alluded to. An editor serves one master, the profession. He cannot serve the exploiter and his dental society. This does not mean that he cannot be useful in bringing together the honest manufacturer and the dentist. You associated editors can help advance the cause of rational therapeutics by encouraging the contribution of articles from individual dentists on these phases of dental practice. The views of individual dentists are, in the last analysis,

the building stones upon which progress rests.

The Council on Dental Therapeutics, in its battle for a more elevated, more rational and more humane system of dental therapeutics, is part and parcel of dentistry. Its work is important for the practice of every dentist. It is a fact finding and fact reporting body. Its propagandists must be found among the type of editors found in your organization. To assist you in reaching therapeutic standards worthy of the position of dentistry, the Council on Dental Therapeutics stands as your servant.

A COURSE OF STUDY IN DENTISTRY

By NEWTON G. THOMAS, M.A., D.D.S., Chicago, Ill.

TWO facts justify something more than a cursory review of the Report of the Carnegie Survey Committee of the American Association of Dental Schools. The first is its importance to dental education. The second is the limited distribution that it will have. The importance of the report to education ought to insure a universal demand for it, and yet only teachers, deans, editors and libraries will see it—a total distribution of a scant twenty-five hundred. The assumption that the men in the ranks would not buy it restricts the output of much valuable information. It likewise keeps the dentist, or, conversely, the dentist keeps himself, in ignorance of many vital undertakings. One could easily name a half dozen publications that a practitioner can ill afford to be without, but which he does do without because the officials of this organization or of that commission accept the suggestion of his indifference to their findings, while he holds himself ineligible to participate therein. This book alone brands that concept as wrong, as well as inimical to the best interest of the profession.

The Carnegie Survey Committee Report is very directly the result of the Carnegie Foundation Report completed in 1926, although efforts to have an "enlarged dentistry" are easily traceable farther back, for a decade or more. The agency that summed up the thought and determination "to discover the activities and problems of the profession and describe these with great definiteness" was the American Association of Dental Schools. The curriculums of dental schools were a tangled mess: they comprised one year of college and four of dental teaching; two years of college and three of dental training, and two years of college followed by four years of dental education. This was extremely confusing. There was need of standardization without fixation. To solve the problem, an analysis had to be made of the function of dentistry in order that an effective program could be outlined to fit a student to meet the necessities of practice. That constituted the task in broad outline. There are other results, such as giving the curriculum meaning to university registrars, easing student transfers and making state boards less dreadful for applicants from other states. A gift from the Carnegie Corporation was achieved and the undertaking was under way.

The analysis mentioned in the preceding paragraph totals a vast amount of labor. Dental and medical literature had to be studied, laymen, dentists and physicians interviewed, questionnaires sent abroad by scores, the prevalence of types of oral disease, disorders and deficiencies ascertained and studies made of the services required of dentistry in its relationships old and new. This was to form a foundation for the structure to be raised by processes of addition, subtraction and deduction, yet to be made.

Under the head "Dentistry and Its Responsibilities," a discussion of the latter is presented at length. Under that title, dentistry expands to the dimensions of a major undertaking. The seriousness of its responsibilities is pitted against the knowledge and practice of the day. Frank statement of the ability of dentistry to cope with the ills presented to it is made a challenge to its vision and courage and acumen. Wherein dentistry is remiss, indifferent, negligent, dentistry is told. The excuses for unwillingness or failure are put plainly. They are not condoned, but are left naked, as excuses and nothing more. This has been no cursory undertaking done with hurry to get at the main job. Every paragraph bears witness to lingering study, comprehensive, thorough. The biggest problems of dentistry have been thrown into the hopper, to emerge in constituent parts for better vision and understanding.

The chapters on "Oral Health Conditions" and "Dentistry and Its Responsibilities" bear out the statement that the book ought to be every dentist's text. The first is a thesaurus of information on the prevalence of oral diseases in both children and adults. Tables—the most comprehensive to be found—tell the results of widespread examinations made by careful observers. The best opinion available is quoted, making the work dependable. Here the committee presents dentistry to the reader in complete outline, the intimacy of its details with those of general health, the multiple manifestations of the mouth in health and disease, its response and witness to general health, combine to make a man conscious of his importance in health ministration. The "just a dentist" complex wanes, and pride in a wealth of possibilities takes its place.

In the second chapter, the responsibilities of dentistry stand out. They are large, they are imperative. They call for strength of purpose and a will to undertake. The job to be done grows before the eyes. Terse sections on "General Practice and Specialization," "The Health Aspects of Dentistry" and "Prevention in Dentistry" stake out these domains precisely, pointedly: "What is there more logical than to expect the dentist to give a comprehensive service for oral health?" And this: "The important rôle of the teeth and mouth in the health of the individual places on dentistry a large responsibility for prevention." In "Dentistry for Children": "Unfortunately the interest in this matter has been mostly one of enthusiasm only." Under "The Education of the Public" is the statement that public health officials "find considerable lack of interest on the part of dentists in dental health education." The "Treatment of Malocclusion of the Teeth" calls for a large section, such as it deserves. The handling of this moot subject—moot among educators—is judicial. The schools do not escape an exposure of their attitudes toward the subject, and the dentist's "disinclination to do dental work for children" does not elude observation. This is the conclusion: "The absurdity of expecting a dentist to render proper health service without dealing with malocclusion is patent to any one

who has even a slight conception of dentistry."

Under "Dentistry and Its Responsibilities," restorative dentistry, its importance and its influence developmentally on the profession, is treated with honest appraisal and respect. It is not scorned as in some published articles, but is treated as a necessity of dental practice. The dental laboratory parasitism is deplored as unbecoming to the claim of dental service. The commercial laboratory, says the report, puts prosthesis "in a somewhat uncertain position and its very perpetuity on a professional basis is threatened." "Oral Medicine," the juncture of the territory of physician and dentist, and "Medico-Dental Relations" are presented stimulatingly and with economy of phrase; likewise, "Social and Economic Relations of Dentistry" and "Dentistry and Public Health Work." "Dentistry an Autonomous Profession" is convincing in its defense of autonomy while a cooperative relationship between dentistry and medicine is made imperative. The recurrent note of each discussion is that the dentist be adequately trained. The review of "Dentistry and Its Responsibilities" points the "Objectives of Undergraduate Dental Education," which is the purpose of the curriculum.

Under "General Observations and Principles," the committee sketches the groundwork and method of their undertaking. They take further note of the field and draw closer to their task. Here, dental education as it has been and is to date is assayed. It is not all bad; and what is good is not impugned because it is old. Rather, it is candidly validated. The tendency to multiply hours and thus exclude the possibility of student study of outside matters, the repetitive laboratory practice making skill a matter of rote rather than thought, the effect of this method on the student's attitude and the faulty liaison between science and practice are brought to light. Graduates from dental schools, from the best of them, will recognize the ancient ills from which they suffered in undergraduate days, sometimes in silence, sometimes vocally enough but always helplessly, and congratulate the students of the future.

The sciences are wedded to dentistry in this context. They are still rightfully referred to as basic and fundamental. In these days, science is as essential to dental thought as the alphabet or syntax is to reading and writing. Always, in the half visible, vague fashion, the sciences were, until recently, thought to be related to dentistry, but it had not been easy to obtain their deserts in the curriculum. For years, discerning minds glimpsed and then saw clearly the essentiality of science to dentistry, and every argument was needed to force the issue. The need became clear, but the teaching problem and the application of the sciences together were hard to manage. The survey clarifies the point thus: "Teachers of the basic sciences and administrators of dental schools are confronted with the problem of how extensively they should go into those sciences. The objectives to be attained and the difficulties which the students encounter in reaching these objectives determine to a large extent how much subject matter and time are needed. A mere superficial acquaintance with a subject hardly justifies the effort required, for such limited knowledge cannot be used effectively."

It is here that the teaching of the sciences becomes vitally important. The assumption frequently followed by schools that any graduate from the dental course may teach any course falls too far short to be considered, and yet this has been assumed. The theory that special reading of a text will equip one for teaching

advances only a short step. A man learned and skilled only in his science, no matter how brilliantly, may fail of the results sought in a dental curriculum. He must know the relation of his subject to dentistry if he would give his work the edge it must have for success. Perhaps no other form of professional education involves so many problems of teaching as does dentistry. On this point, the survey says: "The teachers of the basic sciences are to a large extent the key to the situation. It would be highly desirable that they had pursued a course of study in dentistry and had previously or subsequently received adequate training in the subjects they teach. But there would not be enough teachers with such training to fill the necessary places in dental education, since very few students who graduate in dentistry make any special preparation for teaching."

The task the committee essays to do, then, is to submit a program of study the graduates from which will (*a*) be competent in the maintenance of oral health and the treatment of oral diseases, disorders and deficiencies, with understanding and appreciation of the relationship between oral and systematic conditions in health and disease; (*b*) cooperate effectively with persons engaged in allied fields of service; (*c*) have interest in, and desire for, continuing professional study after graduation; (*d*) practice dentistry with regard for its social, economic and ethical relationships, and (*e*) cooperate effectively in community life. This summation presents the dentist of the future as scholar, skilled ministrant to human health and citizen.

The foregoing is packed into eighty-eight pages, statistics for argument that a dentist might value, for the ballast of papers, for the persuasion of patients; stimulation to self-appraisal, for comprehension of dental service, inspiration for greater attainment and an appreciation of the professional ego in world affairs. Likewise, there grows on one the size of the job called dental education. The reader may recall the events that seem to peer from the lines, betokening the difficulties of the way dental education has come, the impediments to its advance, the effort made for its progress. Looming out of that history, for those who know it, will arise personalities of men who laid foundations for this accomplishment, whose names will be mentioned when an intimate history is written. Further, there must appear to any observer the scope of the work involved and the earnestness of those who guide in education at the moment.

Following are two hundred and forty-eight pages of course analyses detailed and minute, an engrossing and voluminous stretch of labor, rich in comment and wisdom. A cursory glance would indicate discouragingly a field broader by wide margins than what the man in practice had or has attained, but a closer view of it will prove gratifyingly to the man who has tried to keep pace that it is a classification of much of the work that he has done and the knowledge that he has acquired. Names of new courses take form in this chapter and old ones have added importance, an importance magnified by the times and a definite place in the curriculum. Among them are "Materials Used in Dentistry and Their Manipulation"; "Nutrition"; "Orientation"; "Mouth Hygiene"; "Diagnosis and Treatment Planning"; "Anesthesia"; "Technical Composition"; "Practice Management," and "History of Dentistry." Latest in its arrival and a child of the times is "Social and Economic Relations of Dentistry."

The discussion of "Preliminary College Education" falls into two needs and a tendency: "the need for a broad educa-

tion on the part of men and women who practice the profession, the need for maturity in selecting and pursuing a professional course and the tendency to expand secondary education to include the work of the freshman and sophomore years of college." In support of the first need, the Report on Dental Education in the United States and Canada is quoted: "A broad refining education is a fundamental need for those who devote their lives to the professions of greatest service to humanity and who aspire to usefulness beyond the responsibilities of the technician. Leadership in the professional sphere, and in the opportunities in social endeavor and influence is rooted in the soil of a cultural education."

The last quotation, published in 1926, may be taken as indicative of a lack up to that time, and a feeling obtrudes that this lack might extend to the present. Somewhat akin to this feeling is the hope to develop a continuing interest in the literature of the profession after graduation and the maintenance of cultural and social interest. That these possibilities are aided, directed, sometimes piqued into consciousness by the educational program is true, but to rely on them will be disappointing. Culture is an elusive thing, defying definition. Cultural tastes originate farther back than predental or high school courses, and are more fundamental than an attitude of mere grafting supposes. And for its development, example is the most potent sun that can shine upon it. No doubt it is exactly here that responsibility for failure of fruition of scholarly and cultural interest rests. When teachers move only in the small circle of office and laboratory, culling only immediacies out of the present, they can offer small inspiration to the youths who sit under them. College education in its entirety fails of this for the many. Two years cannot be expected to do so much, and therefore the whole dental course must be added.

Out of the long careful study emerges a recommended curriculum, recommended as a guide for dental schools. It has been made clear in the preceding pages that the survey was for that purpose only. No claim is made for its perfection or a near approach to it. The curriculum submitted by the committee was not to be a set matter; no coercion goes with it. It is to form a basis of adaptation; it leaves the schools autonomous still. In the first year, ten subjects appear totaling 1,066 hours. In the second year are twelve subjects totaling 1,140 hours. The third year embraces fifteen subjects requiring 378 hours to which 676 are added for clinical practice —1,060 hours in all. The fourth year presents twelve subjects which, with clinical practice of 813 hours, call for 1,101 hours. The sum of the four years is 4,367 hours.

The number of subjects and the number of hours obtrude on the eye first. This feature has always been the *bete noir* of curriculum builders. The curriculum committee of any faculty will call this the crux of their worries. In days past, the catalogs have shown as many as 5,500 hours. The years have ranged from 1,000 to 1,500 hours—a veritable maelstrom of anxiety and labor for the student. Often enough, the teachers were sympathetic with their victims, but thought the load inevitable. They wanted the student to be fit, but the courses must be thorough: the hours were necessary. The hours are still heavy after all of the study of the survey committee. A partial explanation and solution is submitted: "The time estimates are based on methods of teaching generally employed at the present time. It is expected that a further study of teaching methods will result in more economical

and effective methods and in a further reduction in the amount of time that is now scheduled for class instruction and laboratory exercises. Such a reduction of scheduled time is highly desirable in order that the student may have more time for extra-class study, reading and reflection."

The Curriculum Survey, a prodigious undertaking in itself and made with so much thoroughness and understanding of the problems that the past has bequeathed and the present presents, is only a part of the task involved. In the foreword, this is clearly shown:

> The Curriculum Survey Committee had hardly begun its work when it was made to realize that the undergraduate course of study is only one of several major problems of dental education. However, it seemed best to concentrate all effort on the curriculum and complete it with the expectation that extensive studies of other important problems could be undertaken later. Methods of teaching, graduate instruction and education of dental teachers and research workers, the training of specialists and postgraduate courses should all have attention if dental education is to meet its opportunities and responsibilities. In March, 1934, the American Association of Dental Schools continued the Committee for the purpose of making additional studies, and on December 20, 1934, the Carnegie Corporation of New York made an additional grant to enable the Committee to continue its work. Plans have been made by the Committee to conduct further studies, particularly to investigate methods of teaching.

This book, then, presents one chapter of a large undertaking only. Others are yet to be written. It forecasts the thoroughness with which the others will be done; it indicates a deep stirring in the academic life of dentistry. The appearance of this volume is a marker of academic progress. The other reports promise an equal importance. How much these events will mean to dentistry and dental education no one can say. The answer to that suggestion must come from the schools themselves. The whole process and outcome ought to provide a deep curiosity and a pursuing interest in the profession throughout America and the world.

Personality and Age—Different persons age in the real or physiologic sense at very different rates. An investigation in Germany showed that the subjective onset of old age—the age at which people begin to feel old—is on the average 49 years, but the range varies widely, from below 20 to over 80 years. Another point which emerged from this investigation was that some persons feel old physically long before they do mentally, and vice versa. For activities demanding the maximum expenditure of energy per second, such as sprinting, the optimum age is from 22 to 24. When technic and experience counts it rises, to 28½ for tennis and 35 for golf. The deterioration of intellectual ability, as measured by memory and intelligence tests, is small with age. Ability to learn a systematic subject increases up to the age of 20 or 22, then drops very slowly to 35 and then a little faster to 45 or 50, but falls rapidly only quite late in life. Adults between 20 and 40 learn a modern language more rapidly than children of any age between 8 and 12. The applications of these facts run counter to popular beliefs. Industrial accidents (but not pedestrian accidents in traffic) decrease with age. Unemployed adults can well be trained for wholly new occupations. Adult education should play a much larger rôle in the community. The present break from school to industry is too abrupt, leading to stagnation or even retrogression of a large part of the young people of this country.—London letter, *J.A.M.A.*, Oct. 12, 1935.

DIRECTORY OF STATE SOCIETY OFFICERS AND DATES OF MEETINGS, 1935-1936

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Date of next meeting: Spring, 1936.

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Date of next meeting: April 28-May 1, 1936.

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Date of next meeting: Feb. 25-27, 1936.

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Date of next meeting: April 16-18, 1936.

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Place of next meeting:

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Date of next meeting: June, 1936.
Place of meeting: Roswell.

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Place of next meeting: New York City.

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Place of next meeting: Columbus, Ohio.

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Place of next meeting:

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Date of next meeting:
Place of next meeting:

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Date of next meeting: May 11-13, 1936.
Place of next meeting: Memphis.

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Place of next meeting: Dallas.

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Place of next meeting:

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Date of next meeting:
Place of next meeting:

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Place of next meeting:

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Place of next meeting:

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Date of next meeting: May 18-20, 1936.

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Date of next meeting:

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Place of next meeting:
Date of next meeting:

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Editorials

THE EASTMAN BENEFACTIONS

Through the kindness of Dr. Harvey J. Burkhart, director of the Rochester Dental Dispensary, and representative of Mr. George Eastman in various dental enterprises that have been instituted in Europe, we are permitted to publish an authentic statement of the major donations made by Mr. Eastman for dentistry during his lifetime, and inaugurated by him to be put in operation after his death.

London. In 1925, Mr. Eastman inquired of me as to whether I thought there were any interested parties in London who would be willing to provide maintenance and upkeep provided he made a contribution of $1,000,000 for the erection and equipping of a dental clinic similar to ours. I told him I was quite sure that Lord Riddell, with whom I had had considerable correspondence, might be willing to assume the responsibility. Mr. Eastman then directed me to make the offer and it was promptly accepted in a cable from Lord Riddell, who said he would guarantee maintenance and upkeep. He then requested me to come to London at once to prepare a contract, which I did, the contract being signed by Lord Riddell, Sir Albert Levy and the Trustees of the Royal Free Hospital in the autumn of 1925. The foundation stone was laid by the Prince of Wales in April, 1929, and the clinic was dedicated in November, 1931, since which time it has been in operation and rendering excellent and much appreciated service.

Rome. In August, 1929, a letter was received from His Excellency Giacomo de Martino, the Italian ambassador in Washington, asking Mr. Eastman if he would be willing to duplicate the London Clinic in Rome. Mr. Eastman and I talked the matter over and an affirmative reply was sent. His Excellency Benito Mussolini at once sent Prof. Dr. Amedeo Perna, a member of parliament, to Rochester with Ambassador de Martino, to discuss the matter of the signing of a contract, which was done the latter part of August, 1929. Work was commenced about one year thereafter and the clinic was dedicated April 21, 1933, by Mr. Mussolini, since which time the clinic has been in operation and has rendered excellent service.

Stockholm. In October, 1929, an application was received from the Municipal authorities in Stockholm, inquiring as to whether Mr. Eastman would make the same donation to Stockholm; which was agreed to the latter part of 1930. The ground stone was laid by the crown prince, April 30, 1933, since which time building

Left to right: Mrs. David Henen Morris, wife of the American ambassador to Belgium, Mrs. Harvey J. Burkhart, Dr. Harvey J. Burkhart, Queen Astrid, President Goosens Bara, of the Public Assistance Commission, and King Leopold III visiting the Eastman Dental Clinic in Brussels.

construction has gone on. The clinic is expected to commence functioning about Jan. 1, 1936. The formal exercises of dedication are expected to be held about the first of May, at which time the King of Sweden will probably officiate.

Paris. There was also received in October, 1930, an application from the municipal authorities in Paris, owing to the effort of Dr. Frank M. Stuhl of Paris. A contract was signed in November, 1930. Because of certain general and local conditions, several revisions of the plans became necessary, and the cornerstone was not laid until July 29, 1935, at which time, the Prefect of the Seine, Mr. Villey, and the

municipal authorities took part. I was present and represented the executors for Mr. Eastman. There were also present Dr. Frank M. Casto, President of the American Dental Association, Dr. A. C. Wherry, immediate Past President, Dr. George B. Winter, President-Elect, and a number of American practitioners residing in Paris, and prominent dentists from other countries. It is expected that it will take about eighteen months to get this clinic ready for dedication.

Brussels. In the summer of 1931, the ambassador to the United States from Belgium, Prince der Ligne, sent a communication to Mr. Eastman, at the request of the municipal authorities of Brussels and on the suggestion of Dr. Albert Joachim, for the establishment of a clinic there. The contract was signed in October, 1931, and the foundation stone was laid in October, 1933, at which time Queen Elizabeth and a distinguished company of governmental officials officiated. The clinic was formally dedicated July 31, 1935, when King Leopold III and the late Queen Astrid

Dr. Burkhart and Mrs. Burkhart escorting Queen Astrid and King Leopold III through the infirmary.

presided at the function. On this occasion, on behalf of the executors of Mr. Eastman's will, I formally presented the clinic to the municipal authorities. It was accepted with very appreciative remarks by Bourgmestre Max and President Goossens-Bara of the Commission d'Assistance Publique. Also at these exercises were Drs. Casto, Wherry, Winter, Georges Villain, president of the International Dental Federation, and many distinguished practitioners of dentistry from many other countries.

We were fortunate in having the dedication in Brussels at this time, because it gave to many members of the International Dental Federation who were in Brussels to attend this year's session, which commenced August 9, an opportunity to be present. At these exercises, King Leopold III did a very unusual thing by decorating me with the Order of Leopold II. After the exercises, Dr. Watry, director of the Brussels

Clinic, the American ambassador, the Hon. David Henen Morris, Mrs. Morris, Mrs. Burkhart and I escorted the royal party through the building, during which time we had most cordial and friendly conversations with the king and queen, who expressed great admiration for Mr. Eastman because of his many benefactions, and stated their satisfaction with the beautiful building and fine equipment. They also stated that it would be their pleasure to take a personal interest in the affairs of the institution and do everything in their power to make it a complete success. The king and queen were most delighted and charming, and you can readily understand how distressed we were and what a terrible shock it was when we learned of the death of Queen Astrid.

The Brussels clinic began to function October 1 of this year.

Members of the F.D.I. and guests at the meeting of the F.D.I., August 5, at Brussels, after presentation of the Jessen medal to Dr. Burkhart.

It would seem very appropriate at this time to express a word of commendation and appreciation for the able manner in which Dr. Burkhart has accepted the commission laid on him by Mr. Eastman, and the masterly way in which he has conducted the very important and sometimes very difficult enterprises that have been committed to his care. It is safe to say that no man in the dental profession was ever better equipped to carry to a successful issue the various obligations that have been assigned to him; and the pro-

fession at large as well as the authorities of the different European countries have learned to look on him as an executive of the highest order, and as a man endowed with unusual ability to cope with the various tasks that have been presented for his solution.

Dentistry today the world over stands higher in popular esteem because of the benefactions of George Eastman, and these benefactions could never have been carried to their present successful issue without the outstanding ability and devotion of the one man in whom Mr. Eastman reposed such confidence. The name of Harvey J. Burkhart will go down in the history of dentistry as having served his profession in a most unusual way and having given to the world an example of what a broadminded and able executive can accomplish for the benefit not only of the profession, but also of the world at large.

We congratulate Dr. Burkhart on the splendid honors that have been bestowed on him, not only by royalty, but also by the members of his profession. At Brussels, the Jessen Medal was awarded to Dr. Burkhart by the International Dental Federation, a very appropriate ceremony on a most auspicious occasion.

Wherever dentistry is known and practiced, the names of two men must henceforth stand out as conspicuous in their contribution to the welfare of the profession and their fellow men. Mr. Eastman has donated more money than any other one individual for the dental welfare of the children of the world, and Dr. Burkhart has devoted the best years of his life to the consummation of the high aims and aspirations of the man whose vision and beneficence made these outstanding philanthropies possible.

DONATIONS FOR DENTAL RESEARCH

Apropos of benefactions in dentistry, the lament has frequently been made that our profession has not attracted to it in the past a proportionate amount for research as compared with the donations for medicine. Millions have been awarded for medical research by philanthropists, all of which is most commendable and gratifying,

and now at last dentistry is beginning to come into its own and share in this kind of philanthropy.

At the opening exercises of the Chicago College of Dental Surgery, Dental Department of Loyola University, Oct. 1, 1935, the dean, Dr. W. H. G. Logan, made the following announcement:

Through the generosity of a Chicago philanthropist, who prefers to remain anonymous, a foundation for dental research has recently been established in the Dental School of Loyola University, which is to be formally known as "The Foundation for Dental Research of the Chicago College of Dental Surgery," and will have available annually a sum of $25,000 as a minimum.

The work of this foundation will consist of a systematic and coordinated investigation of some important problems in oral and dental pathology and bacteriology, and will aid in the advancement of dental science and public health. The major part of the research activity will be carried on in the laboratories of the dental school, while another section will be undertaken at the John McCormick Institute for Infectious Diseases, which is adjacent to the dental school.

The administration of this foundation will be under the jurisdiction of a committee composed of eight members of the teaching staff of the dental school; namely, William H. G. Logan, M.S., M.D., D.D.S., chairman; Edgar D. Coolidge, M.S., D.D.S., vice chairman; Robert W. McNulty, M.A., D.D.S., secretary; P. G. Puterbaugh, M.D., D.D.S.; Emanuel B. Fink, Ph.D., M.D.; Thesle T. Job, Ph.D.; Rudolf Kronfeld, B.A., M.D., D.D.S., and W. D. Zoethout, Ph. D.

The foundation has also been fortunate in securing the following group of scientists, all eminent in the field of health service, to act in an advisory capacity: Ludvig Hektoen, M.A., M.D., director of the John McCormick Institute for Infectious Diseases; Richard H. Jaffe, Ph.D., M.D., pathologist at Cook County Hospital, and R. A. Kuever, Ph.G., Ph.C., biochemist at the University of Iowa.

THE STUDY CLUB

In fifteen years, the study club has become a feature of importance to the dental profession. Fifteen years ago, a Chicago group asked timorously, "Do you think the schools will support us with teachers and demonstrations if we organize?" Today, the study club is a feature of both urban and rural organization, an essential to the life of the main body, an evidence of alertness and a desire to progress. The study club is a sort of popularized postgraduate course for those who would find it difficult to attend college. Few men of the schools could be found who would not be pleased to respond to a request from a club to appear before it.

Early in the history of the club, it was plain that general interest lay in the so-named practical phases of dentistry. This was to be expected. To supply that need in the experimental days was necessary for its very existence. Conditions must be met as they are found. The advancing arts and technics themselves proved the need of more and more basic knowledge, and gradually the clubs expanded their interests and lectures on the fundamentals increased. With the broadening of the club's desire, medicine was called to the aid of dentistry, and the response was more than gratifying. Said one medical teacher, "I regard this work as of primary importance. I shall adapt my program to it first."

Herein is its importance. The study club carries the best of dental knowledge as nothing else could do to the very doors of dental offices everywhere. The members of the group experience a feeling of at-homeness and are at ease in the familiar presence of their neighbor. They overcome their timidity in the company of their fellows, whose problems are of a kind. Their numbers and their similarity of life take away any fear of the visitor, no matter who he may be. And these things are essential to learning. The obsession of metropolitan superiority in opportunity, in privileges, is being removed. What the larger places may know and what they do, the smallest places may know and do. Dentistry is being metropolitanized to its far borders as is society in every sense.

The chairmen of study club program committees have not always an easy task. They are subject to the demand of the group and obligated to the need of the group. There may easily be a distinct difference between these two. The demands are easily ascertained and their fulfillment will please. The need of the group must be a matter of study and discernment and perhaps diplomatic suggestion and leadership. Making a program may be an accomplishment of easy indifference, but, at its best, it requires analytic thinking, study and care in approach. If the courses are to be postgraduate in character, as is frequently said, the chairmen and members of the program committee may think of themselves by university titles in planning them. The duties of the committee become exacting, and fundamental to the very health and education of the profession.

It is worth noting that the large meetings of the larger centers

are expanding from year to year. They are bringing to their platforms men outside of dentistry who are best informed in many subjects that a few years ago would not have been considered for dental programs. Cultural matters are being emphasized in the schools, the public relationship as well as the interprofessional of medical, legal, economic is being heard. A prospectus of the future college recently published by the Curriculum Survey Committee of the American Association of Dental Schools considers all these things. This new feature must permeate the professional body in order that the whole organization move together. This means that these things must reach the ranks by way of the study club. This suggestion indicates other matters and movements the mode and purpose of which should be of deep interest to every dentist everywhere.

Let us mention again the Curriculum Survey as indicative of an interest that transcends many others, showing the activity of dental educational life—the schools. And dentistry cannot divorce itself from these centers of professional life—not if it wished to, which, of course, it does not. The diploma may separate an individual from all academic attachment, but nothing can separate the school from its place of influence on the profession. There ought never to be a program of any importance without representation of one of the many phases of education. The literary interests of the profession—what of them? Books, journals, bulletins, special publications: what comes nearer to professional life? The profession could have no life without them. But how often is journalism represented on a study club program? Of a city or a state? Likewise exist organizations dedicated to some purpose or set of purposes affecting dentistry *en masse,* inaugurating movements, promulgating ideas, shaping the common destiny of the profession. They need not be an integral part of the general organization, but they affect it for ends that touch all of us. The *esprit de corps* should embrace knowledge of them. Plans and activities that stir constantly in all of them concern every man with a desire to keep acquainted with the affairs of his profession. These items are not merely indicative of possible program material, but refer also to the common welfare and appreciation of dental programs.

The study club has other connotations that deserve thought and

comment. The retroactive influence of the club on state and national meetings deserves consideration in behalf of each. It does seem safe to say that the study club of itself is one of the most effective agencies for professional advance undertaken in recent years. Its value is predicated upon its closeness to the workers in the field and the subject matter chosen for study. T.

PRACTICE IN PARAGRAPHS

This department is intended for busy readers. It aims to tell a vivid story in a few words. Items should be of a practical character, and free from padding—not more than a paragraph or two. We exact no limit, but two hundred words can tell most of these stories. Send in your ideas; they will be welcome.

Control of Hemorrhage—Gauze wrung out of hot water or a hot saline solution, will often when applied to a bleeding surface, check hemorrhage. This may also be used during an operation when the bleeding is so profuse that it obscures the operating field.—*James L. Zemsky, 147 Fourth Ave., New York City.*

Child Management—Successful management of the child in the dental office depends on the operator's ability to reach the level of the child's understanding and interests. All adjustments of the approach to inspire confidence in the child's mind must be made by the operator.—*Frank A. Delabarre, 520 Beacon St., Boston, Mass.*

Big Words—Big words fill the magazine fast and keep other writers out. We all have the same big words at our disposal, but let's leave most of them in the dictionary. If we don't know what a word means, we have to look it up, but that takes time. Some time, just as an experiment, instead of explaining to the patient about the endless chain of "dontias" just say two words: "I advise."—*Herbert Ely Williams, Red Bank, N. J.*

Pain in Temporomandibular Joints—Presence of pain and tenderness in the temporomandibular joints, accompanied by difficulty in moving or opening the jaw (trismus), with no apparent cause for it, is suggestive, at times, of an arthritic condition. Application of either hot or cold to the affected joints and rest often relieves this condition. A general treatment for arthritis, including diathermy, invariably effects a cure.—*James L. Zemsky, 147 Fourth Ave., New York City.*

Making Good—When something goes wrong, the time spent in arguing would be better used in "making good." Although the dentist is not at fault, difficulty often

arises in convincing the patient otherwise. "Making good" often has a more favorable reaction than having made good from the beginning. A strengthening of confidence often results therefrom. Ethical dentists do not advertise, but satisfied patients often do. The policy of "making good" would prompt one to be more careful in the first place.—*Herbert Ely Williams, Red Bank, N. J.*

Avoid Snap Diagnosis—Good roentgenograms, together with reliable laboratory reports, including blood count and coagulation and bleeding-time tests, Wassermann reaction and urinalysis, are indispensable in diagnostic examination. The clinician who gets along "just as well" without these often risks his reputation, for not infrequently patients turn to other practitioners, who thoroughly examine them, taking advantage of all diagnostic means available, and thus "show up" the "snap" diagnostician.—*James L. Zemsky, 147 Fourth Ave., New York City.*

Denture Technic Vs. Psychology—From George Washington's crude "doorspring" replacements of 1790 to present day denture perfection, denture science has overlooked but little in carrying on where nature leaves off. There are several forms of available instructive, printed pamphlets, which are invaluable aids to new denture patients. But a new careful assembly of radically different, nice sounding words, embodying psychology and common sense, convincingly telling patients what to do with dentures after they get them, are as important as the improvements in technics which are bound to come with the coming years.—*Herbert Ely Williams, Red Bank, N. J.*

Function of Rugae—The function of the palatal rugae is principally to assist in speech. Faulty tongue function is a contributing factor in some forms of malocclusion and corrective speech exercises are commonly employed by the orthodontist in his attempt to restore normal oral function. There seems to be a lack of appreciation by the profession of the importance of this function to clear enunciation, judging from the number of dentures seen with smooth highly polished surfaces in that region. The restoration of the rugae as an aid to speech follows closely the establishment of efficient mastication and conformity to esthetic requirements in such cases.—*Frank A. Delabarre, 520 Beacon St., Boston, Mass.*

Reversible Hydrocolloid Impression Material—Agar jelly, about 8 or 10 per cent, combined with coloring, flavoring and an antiseptic, composes these mysteriously named sticks. Most specimens of agar contain an impurity which prevents plaster from setting in contact with it. Soaking the agar flakes or shreds for an hour in a few changes of cold water washes this out. A 10 cent wire strainer is convenient to drain the soaked flakes, which are packed into the mixing syringe and boiled. Color and flavor can be added if desired: cost, 5 cents a stick or less. I should like to know whether there is any reason for adding cellulose fiber and magnesium soap, as given in the abstract on page 1820, the October JOURNAL. I think "Hydrocolloid Impression Material" is an example of jargon which should be placed in the *Index Expurgatorius* from now on, "agar jelly" being substituted by all editors.—*J. L. Barber, Coronado, Calif.*

COUNCIL ON DENTAL THERAPEUTICS

NUM-DENT—NOT ACCEPTABLE FOR A.D.R.

The Council has authorized publication of the following report.

SAMUEL M. GORDON, *Secretary*.

Num-Dent is marketed by the Num Specialty Co., Pittsburgh, Pa., as a "Surface Anesthetic and Antiseptic." No statement of composition appears on the label. An inquiry addressed to the firm in 1933, requesting a statement of composition, was not acknowledged.

The product was not submitted by the firm for consideration, but because of numerous inquiries received from dentists, examination of Num-Dent was undertaken in the A.D.A. Bureau of Chemistry.

From the chemical examination appended below, it may be concluded that a solution made by dissolving benzocaine (ethylaminobenzoate), 18 gm., in 20 c.c. of alcohol and adding methyl carbitol to make 100 c.c. would simulate the essential properties of Num-Dent. Thus, Num-Dent is not unlike Fantazn and Pro-Thesia, surface anesthetics which were the subject of Council reports holding them not acceptable for A.D.R.[1] No evidence is available that it will do more than a 10 per cent solution of benzocaine in alcohol, which is described in A.D.R.

Num-Dent thus represents only another case of exploiting a well-known drug in a preparation of undeclared composition, under a non-informing proprietary name. The Council declares Num-Dent unacceptable for A.D.R. for these reasons.

CHEMIST'S REPORT

Seven original packages of Num-Dent (Num Specialty Co., Pittsburgh, Pa.), price $2.50 each, were purchased on the open market for examination.

The following appeared on the carton:

Surface Anesthetic And Antiseptic
Alcohol 19%

No indication concerning the composition appeared on the label.

Each bottle contained approximately 28 c.c. (1 fluid ounce) of a light clear straw colored liquid with an odor of oil of rose. The specific gravity was 0.9985 and the refractive index 1.4492.

Qualitative tests indicated the presence of ethylaminobenzoate and a liquid possessing the following properties: specific gravity, 25 C./25 C. 1.0368; N_D^{25} 1.4311; and boiling point, 191-192 C. The recorded constants for methyl carbitol (Carbide and Carbon Chemicals Corporation) are: specific gravity, 20 C./20 C. 1.0354; boiling point, 193.2; N_D^{25} found for commercial sample, 1.4260.

Kjeldahl determination for nitrogen yielded 1.51 per cent, equivalent to 17.73 gm. of ethylaminobenzoate per hundred cubic centimeters.

It was therefore concluded that a solution made by dissolving benzocaine, 18 gm., in 20 c.c. of alcohol and adding methyl carbitol to make 100 c.c. would simulate the es-

1. J.A.D.A., 20:1526 (Aug.) 1933; 22:494 (March) 1935.

sential properties of Num-Dent. Such a solution was prepared. The refractive index was 1.4440.

(End of Chemist's report)

A specimen of Num-Dent, with solutions of ethylaminobenzoate (benzocaine) made up as follows: (a) 4.25 gm. benzocaine, 20 c.c. ethyl alcohol and carbitol to make 25 c.c.; (b) same as (a) but with methyl carbitol to make 25 c.c., were sent to a clinician to determine their effectiveness on patients. In due time, this investigator reported: "I am at last ready to report on the three sample bottles of surface anesthetics which you sent me some time ago. I have had an assistant and three dental students working with me, and we are all agreed that each of these is inadequate."

DEBACTEROL—NOT ACCEPTABLE FOR A.D.R.

The Council has authorized publication of the following report.

SAMUEL M. GORDON, *Secretary.*

Concerning Debacterol, put out by the Northern Research Laboratories, Inc., Minneapolis, Minn., its promoters say: ". . . *chemical research* brings to Dental Science a new and powerful weapon in the fight against pyorrhea and Vincent's Infection." It is said to be: " . . . a smooth concentrated material, actively germicidal, strongly astringent, noticeably stimulating. Valuable where such reactions are indicated." It is further stated that *"approximately one thousand dentists are using Debacterol successfully."* About one ounce sells for $5.

The chemical composition of the product is described as: " . . . the sulphonic acid of certain hardwood distillation fractions. Scientifically produced for the specific treatment of Vincent's Infection, and as an adjunct in the treatment of Pyorrhea." A similar statement appears on the labels.

Although the firm was supplied with a copy of the rules of the Council in 1933, the product has not been submitted to the Council. In view of the inquiries received from dentists and the representations made for the product, it was examined in the A.D.A. Bureau of Chemistry. The chemical report, which is appended, indicates that the preparation, for all practical purposes, is essentially an aqueous solution of sulphurous and sulphuric acid with suspended carbon particles, evidently arising from the action of concentrated sulphuric acid on the phenolic compounds that entered into the original preparations. Hence, any action would be due to the sulphuric acid. Such action has been described in connection with the discussion of Emedent Pyorrhea Treatment, another pyorrhea product which contained 40 per cent of this acid.

Despite the claim that Debacterol is being used successfully by about 1,000 dentists, no evidence is available that such a mixture is useful in treating trench mouth or pyorrhea beyond the conservative methods now in use. If one desires to use sulphuric acid, with all of its limitations and dangers, there is available a phloroglucinol sulphuric acid mixture introduced in 1913 by Stecker,[1] which contains approximately 12 per cent of sulphuric acid, or aromatic sulphuric acid, U.S.P., which is about 20 per cent sulphuric acid. These have been used primarily as "tartar solvents" and as caustics, but they have not found much favor because the dangers attending their use outweighs any benefits derived therefrom. Sulphuric acid is uncontrollable; it attacks healthy as well as necrotic tissue. Modern periodontal methods rely more on careful operative technic

1. Prinz, Hermann: Diseases of Soft Structures of Teeth and Their Treatment, Philadelphia: Lea & Febiger, 1928, p. 425.

and the use of less corrosive drugs than on the employment of caustic and corrosive drugs. At any event, these two preparations are more refined than a mixture of wood tar and sulphuric acid made by an apparently uncontrolled reaction. Its use is not deserving of the serious respect of dentists.

In view of the foregoing, Debacterol is declared not admissible to Accepted Dental Remedies; i.e., because of a frank statement of composition is not given (Rule 1); tests for determining the composition are not made available (Rule 2); it is advertised with unwarranted therapeutic claims (Rule 6); the presence of potentially toxic substances such as sulphuric acid are not declared (Rule 7); the name is not expressive of the composition (Rule 8), and the composition of the product is such that its use is not in the interest of the public and the profession (Rule 10).

The report of the chemical examination follows:

DEBACTEROL

Three original packages of Debacterol (Northern Research Laboratories, Inc., Minneapolis, Minn.), price $5 each, were received for examination.

Each carton contained a cylindrical vial sealed with wax, a circular and a small insert.

The following appeared on the principal label:

A Sulphonated Derivative of Hardwood Distillation for Treatment of Pyorrhea Vincent's Angina and diseases of the mouth.

POISON

The following appeared on the small insert:

This material is strongly acid. Keep off clothes and linens.

Each package contained approximately 37 gm. of a black, tarry semiviscous liquid with a predominating odor of sulphur dioxide, and a faint odor of creosote. Black particles were suspended in the liquid.

The product was acid to litmus. It was partly soluble in water and black particles were suspended.

In view of the statement in the advertising circular: . . . "because of its viscosity and degree of surface tension, DEBACTEROL tends to reach entire areas of infection," the surface tension was determined by the ring method. It was found to be 68.2 degrees per centimeter. (The surface tension of water is 72 degrees per centimeter at 25 C.) The specific gravity was 1.53.

A residue on ignition was not found.

Qualitative tests indicated the presence of sulphur dioxide, sulphate (as sulphuric acid), phenolic bodies and carbonaceous material.

Quantitative determinations yielded the following:

Water insoluble (carbon)	9.8 per cent
Acidity as sulphuric acid	35.1 per cent
Sulphate (as H_2SO_4), gravimetrically	25.9 per cent
Sulphite (as H_2SO_3), gravimetrically	14.3 per cent
Phenolic compounds as C_6H_5OH	4.6 per cent

From the foregoing, it may be concluded that Debacterol as purchased is essentially an aqueous solution of sulphuric and sulphurous acid in which carbon particles are suspended. It is probably the end-result of the interaction of sulphuric acid on phenolic compounds.

BUREAU OF PUBLIC RELATIONS

TREATMENT AND MAINTENANCE OF PULPLESS DECIDUOUS TEETH*

By CHARLES A. SWEET, D.D.S., F.A.C.D., Oakland, Calif.

SHOULD all pulpless deciduous teeth be condemned or should they be treated and saved in the mouths of young patients? This seems to be the question in the minds of most dentists who have an interest in dentistry for children.

With sufficient experience in caring for children and with conscientious effort to treat pulpless deciduous teeth, one could give case histories that prove the contention that all pulpless deciduous teeth can be saved. Likewise, case histories can be given that would lead one to believe that all pulpless deciduous teeth must be extracted. But let us not permit our enthusiasm because of a few fortunate or unfortunate experiences to sway us to one extreme or the other. Would it not be better to try to determine why one is successful in one instance or equally unsuccessful in another?

With sufficient knowledge and experience, our judgment will be such that it is possible to select those cases that will respond to treatment and thus render a service of real value. The key to the successful treatment of pulpless deciduous teeth is ability to make a correct diagnosis.

*Read before the Section on Mouth Hygiene and Preventive Dentistry at the Seventy-Sixth Annual Session of the American Dental Association, St. Paul, Minn., Aug. 8, 1935.

DIAGNOSIS

Extraction is indicated (1) if caries has penetrated the bifurcation of the roots; (2) if two-thirds of the root or roots has been absorbed, owing either to normal absorption or to infection; (3) if there is a fistulous opening at or around the gingival margin of the tooth, or (4) if the permanent tooth to follow the deciduous tooth is absent.

When none of the foregoing conditions is present, deciduous teeth can be successfully retained in the mouth in a healthy condition for the allotted time.

During the past fifteen years, I have made certain clinical observation making it possible to correlate the four cardinal diagnostic points that spell success or failure in the treatment of pulpless deciduous teeth:

1. If caries has penetrated the bifurcation of the roots, necrotic alveolar process in communication with the oral cavity can be neither sterilized nor absorbed. Therefore, treatment is contraindicated.

2. If two-thirds of the root or roots has been absorbed, there is communication with the oral cavity, with a necrotic process that cannot be sterilized, nor will it be absorbed.

3. If there is a fistulous opening at or around the gingival margin, the peridental membrane fibers have been destroyed, and even though the tooth may be suc-

cessfully treated, reinfection will occur through the passage of débris and infected material from the oral cavity through this gingival opening.

4. If no permanent tooth follows a deciduous tooth, apparently the normal absorptive process does not take place; which, in some way, causes the elimination of the infection in the apical area, treatment resulting in failure.

With the preceding information, it will be possible to classify those teeth that are amenable to treatment. With proper treatment, these teeth can be maintained for their allotted time in a healthy condition as far as clinical examination of the teeth and also physical examination of the patient can determine.

TREATMENT

1. The molar teeth are best opened with a 559 fissure bur in the contra-angle handpiece, while the anterior teeth should be entered from the lingual surface. The tooth should be opened so that all parts of the pulp chamber are clearly exposed. Débris is washed out with a warm spray, further cleansing being carried out with spoon excavators only. Formocresol on cotton is sealed in with a temporary filling and the patient is dismissed for forty-eight hours.

2. With the tooth protected with cotton rolls, the cotton is removed and the upper third of the root canals is thoroughly broached with barbed broaches only. Another dressing of formocresol is again sealed in with a temporary filling and left for three to four days.

3. With cotton rolls in place and the tooth thoroughly washed with alcohol, the dressing is removed. The root canals are thoroughly broached, with care not to pass the broach through the apex. Particular care should be exercised not to pass too far down the root canals, as absorption of the roots of deciduous teeth is from the under surface, and the apical opening may be in the middle third of the root. A third dressing of formocresol is sealed in with temporary filling and the patient is dismissed for three to four days.

4. The tooth is dried, thoroughly washed with alcohol, and protected with cotton rolls. The temporary filling and cotton are removed and the pulp chamber is filled with a creamy mix of zinc oxide and eugenol. With a pellet of cotton as a plunger, this paste is forced into the root canals. Many times, it will be forced through the apex of the canal. A cement base is next placed in the tooth and a permanent filling completes the case.

If there is a fistula present and it has not responded to the formocresol treatment, the following procedure should be used.

ROSE HEAD BUR TREATMENT

Keeping the tissues dry, the operator applies a topical anesthetic to the surface for one minute. The fistula is touched with 95 per cent phenol and, with a large rose head bur (round bur about No. 6) in the contra-angle handpiece, this bur is inserted in the fistulous opening and the necrotic tissue is burred out in all directions, until sound tooth structure or alveolar process is reached. The bur is removed and the area is allowed to bleed through the fistulous opening for a few moments. A small wick of gauze saturated with camphor-phenol compound is then placed in the opening to allow drainage. This wick is removed by the parent just before bedtime and after the oral cavity has been thoroughly cleansed, if healing has not been so rapid that the wick is displaced.

TREATMENT OF DECIDUOUS TEETH

Why do we treat deciduous teeth? Because (1) the repaired deciduous tooth is the most successful space maintainer; (2)

the repaired deciduous tooth allows normal function; (3) the repaired deciduous tooth maintains the opposing teeth in normal position; (4) repair of the deciduous tooth prevents the early eruption of the permanent tooth, thereby assuring maximum calcification, and (5) the favorable deciduous pulpless tooth can be properly repaired in one hour, the cost being thereby decreased by at least one half. The item of cost has to be considered by about 80 per cent of the public.

The foregoing reasons for the maintaining of pulpless deciduous teeth whenever possible are conclusive.

HEALTH CONSIDERATION

Should all pulpless teeth, both permanent and deciduous, be classified alike? Has not the condemnation of the pulpless permanent tooth caused us to be skeptical regarding the pulpless deciduous tooth also? Are the structures of the deciduous tooth and surrounding tissues identical to those of the permanent tooth and surrounding tissues? Have we sufficient knowledge of blood supply, the absorptive process associated with deciduous teeth and the histology of the surrounding tissue to be guided by any information other than clinical and physical observation and reasoning compatible with these observations? Until such time as the profession has authentic research information on the deciduous teeth to answer the foregoing questions, we must be guided entirely by clinical experiences.

The pulpless tooth is the original source of infection, and our treatment is designed to eliminate this source of infection. If this were all that needed to be accomplished, our treatment of permanent teeth, no doubt, would be extremely successful. There is always a secondary infection of the periapical tissues that causes many failures in the treatment of permanent teeth. Possibly, this was why the apicoectomy was resorted to, in hopes of eliminating the periapical infection. For a period of from fifteen to thirty days immediately following an apicoectomy, a healthy condition is, no doubt, present, but a reinfection occurs sooner or later, and the tooth is lost. If apicoectomy could be performed frequently enough, no doubt a most satisfactory condition could be maintained.

Fortunately, Nature is carrying on a continual absorptive process with deciduous teeth that is very similar to the apicoectomy; therefore, secondary infection in the apical area is eliminated continuously. If the source of the primary infection, namely, the tooth itself, has been eliminated, it must be realized that deciduous teeth can be successfully retained, since the natural absorptive process associated with the deciduous dentition eliminates the secondary infection.

If all pulpless deciduous teeth are to be removed, and if the following observation of Badanes is true, the dental profession has quite a task ahead of it in extraction alone: "During a period of twenty-five years, close observation by the writer in examining the work done on children's teeth has revealed the fact that more than half of the number of all deciduous teeth with fillings, most of them skilfully done and beautiful in appearance, have also had fistulae alongside, with pus exuding on the slightest pressure.[1]

After the extraction, functional space maintainers should be constructed; which would consume an even greater amount of time and, regardless of how low a fee might be charged, would be beyond the present financial resources of the public.

CONCLUSION

1. With proper treatment, possibly 50

1. Badanes, B. B.: D. Cosmos, 76:761 (July) 1934.

per cent of all pulpless teeth can be saved to serve their allotted time.

2. With our present knowledge of the deciduous dentition and surrounding tissues, which is entirely limited to clinical observation supplemented by physical examinations, all favorable pulpless deciduous teeth, when properly treated, are maintained in a healthy condition.

3. Because vital or pulpless deciduous teeth are the most perfect space maintainers, they should be maintained.

4. Economically, the treatment of pulpless deciduous teeth costs from 50 to 75 per cent less than the construction of a functional space maintainer.

5. Since deciduous teeth with exposed pulps may, when properly treated, remain vital, they have not been included in this discussion.

6. Emphasis must be laid on the employment of the four diagnostic points to eliminate failure of treatment.

7. As there will always be a certain number of deciduous teeth to be extracted that will not respond to treatment, anyone who contends that all pulpless deciduous teeth can be retained in the mouth is surely not taking advantage of all present-day knowledge. If we grant that this is true, does it not seem logical that those who advocate the removal of all pulpless deciduous teeth are equally guilty of not taking proper care of their child patients?

Those of us that hew to the middle line have the advantage of rendering a service that we know will not only be successful clinically, but will also allow normal function, maintain space and be within the economic reach of a larger majority of all people.

Orthodontist—Please Note

American orthodontists have an exceptional opportunity to help the officials of Vermont solve the mystery of the triple murder recently disclosed near the town of Middlebury. The type and quality of orthodontic appliances found in the mouth of one of the two children would indicate that the orthodontist in charge of the cases should have case records that would identify the victims.

Will every orthodontist and every general practitioner practicing orthodontia who sees this article please refer to page 1636 of the September, 1935 issue of The Journal for a full description of the cases.

Recently, an erroneous report was printed to the effect that the case records of the late Dr. Ned Stanley, of New Bedford, Mass., indicated that the murdered children had been patients of his. In reply to an inquiry, the following letter was received from the state's attorney of Addison County, Vermont:

> In reply to your question regarding the skeletons found here in Middlebury as to whether they were patients of the late Dr. Ned Stanley of New Bedford, Mass., I answer that question in the negative. As yet we have no definite clews. I hope that you may be able to help us in the matter.
>
> (signed) John T. Conley,
> *State's Attorney.*

There is strong possibility that the murderer can be apprehended if the members of the American Dental Association, and particularly the orthodontists, search their files for case records which correspond to the dental records of the victims.

BUREAU OF PUBLIC RELATIONS

AMERICAN DENTAL ASSOCIATION

212 East Superior Street

Chicago, Illinois

DENTAL HEALTH EDUCATIONAL MATERIAL

Dentists will find some of this material excellent for their waiting room table, and for use at the chair in educating both parents and children. *Education is the basis of preventive dentistry.*

Hygienists, nurses, teachers and public health workers will also find that much of this material will assist them greatly in their health activities. *Education is fundamental in public health work.*

Make use of this dental health educational material — order by number — order blank is printed on page 1984.

PAMPHLETS ON MOUTH HEALTH

1. Children's Teeth—How to Use and Keep Them Pt. I (Deciduous Teeth)..... 3c
2. Children's Teeth—How to Use and Keep Them Pt. II (Permanent Teeth)..... 3c
3. How to Build Sound Teeth—Children's Teeth Pts. I-II (Prenatal)..... 3c
4. The Promotion of Health in the Mouth..... 3c
5. The Masticating Machine..... 3c
6. What Bacteria Do in the Mouth..... 3c

7a Outline of Lectures for Nurses..... 5c

TALKS FOR LAY AUDIENCES

8. Clean Teeth as an Asset (For high school pupils)..... 5c
9. The Care of Children's Teeth (For adult audience)..... 5c
10. A Constructive Program for Dental Health..... 5c
11. The Teeth and Health (For adult audience)..... 5c

RADIO TALKS

12. "Radio Talks" (booklet) contains 22 fifteen-minute talks covering a variety of dental topics; also includes brief instructions to radio speakers 15c
13. 7 minute radio talks (List of 50 different subjects furnished on request).....5c each—6 for 25c

13a Series of Twenty-Five Radio Talks (approved by the A.D.A. and the U. S. Public Health Service).....5c each—6 for 25c

A BENEFICIAL PRODUCTION CIRCLE

PAMPHLETS ON NUTRITION

14. "The Question of Foods," by Ethel Austin Martin, B.C., M.S..... 5c
15. "Practical Nutritional Suggestions for Dentists," by Percy R. Howe, D.M.D..... 5c

STORIES, PLAYS AND RHYMES

16. A Sad Story of Mary-Suck-Her-Thumb and Other Health Stories..... 5c

16a Dorothy Dot and Dorothy Dod and Other Dental Rhymes..... 5c

17. Toothsome Stories..... 5c
18. The Story of the Food Chopper (for primary grades)..... 5c

19. **The King's Soldiers (For primary grades)** 5c
20. **Stepping Stones to Happiness** (dental playlet) 5c
20a Bad Baby Molar (dental playlet) 5c
21. Grandfather Molar (dental playlet) 5c
22. Sells Health-O Circus (dental playlet) 5c

(Through the courtesy of the Illinois State Department of Health, the Bureau is enabled to offer the privilege of using the manuscript and staging properties for the very excellent dental health play entitled "Sells Health-O Circus." Information as to the conditions under which circus properties are obtainable may be secured on request.)

DENTAL PROGRAMS

23. "Achievements and Results in West Va. of the Jenkins-Jones Dental Dispensary and McDowell County Dental Clinic," by T. G. Epling, D.D.S. 5c
24. "Public Health Dentistry in Santa Barbara County," by Leo Mollath, D.D.S. 5c
25. "Dentistry in Public Health," by C. T. Messner, D.D.S. 5c
26. "Significance of Clinical Experience as Related to Prevention for the Child Patient," by Lon W. Morrey, D.D.S. 5c
27. "New York Surveys Its Dental Clinics," by the Committee on Community Dental Service, N. Y. Tuberculosis and Health Association 5c
28. "What Is the Economic Value of Dental Health to the Community?" by Arnold M. Kegel, M.D. 5c
29. "Dental Health Week" by C. J. Hollister, D.D.S. 5c

MISCELLANEOUS

30. To Boys 1c
31. To Girls 1c
32. To Mothers 1c
33. The First Permanent Molar 1c
33a Public Health Aspects of Vincent's Infection, by J. M. Wisan 5c
34. "Facts Demanding Serious Professional Consideration as Disclosed by Dental Contact with the Committee on the Cost of Medical Care," by H. L. Phillips, D.D.S. 5c
35. "Proper Dental Care for the Child Patient," by T. A. Gardner, D.D.S. 5c
36. "The Preparation and Delivery of a Speech," by Bertram G. Nelson 5c
37. "Are Extension Courses a Success?" by J. B. Jenkins, D.D.S. 5c
38. "Prosthesis in Children's Dentistry," by F. B. Rhobotham, D.D.S. 5c
39. "Dental Internship in a General Hospital," by D. F. Lynch, D.D.S. 5c
40. "Outlines for Teaching Oral Hygiene from the Kindergarten to the Eighth Grade," by Emma P. Durbin, R.N. 5c
40a List of Hospitals Offering Dental Internships 5c

NEWSPAPER ARTICLES

41. "John, Mary & Jack," a series of 52 short semi-continued newspaper stories, approved by the American Dental Association and the U. S. Public Health Service. Prepared for insertion in your local newspaper ..... No charge

POSTERS

42. *For children,* size 20 by 30 inches, in colors, on high grade cardboard; designed to encourage the child in the care of the teeth $1.00
43. *For adults,* size 20 by 30 inches, in colors, on high grade cardboard; designed to interest parents in the care of children's teeth $1.00

(Also see additional posters explained on page A-35.)

CHART

44. *"A Survey of Dental Diagnosis During Childhood"*..... 15c

An excellent and comprehensive chart on diagnosis, developed by one of the country's outstanding specialists in children's dentistry. Every dental practitioner needs one. Very useful to a hygienist, nurse, and physician.

45. A PRACTICAL TOOTHBRUSHING CHART FOR LAY EDUCATION

(See page A-30.)

46. MOTION PICTURE FILM SERVICE

Dental educational films are available in both 35 m.m. and 16 m.m. stock. These may be rented for $1.00 a day or $3.00 a week, plus shipping charges both ways. Charge is made for each day of use before an audience, but no charge for time in transit. The renter is held responsible for injury to films. *In requesting films, please state the ones desired, when desired and for how long.* Following is a description of the films available:

"Your Mouth" (35 m.m.), 15 minutes. Synopsis: Gives cause, progress and results of tooth decay; methods of prevention; brings in nutritional aspect, use of roentgen rays, brushing, etc. Suitable for high school and adult audience.

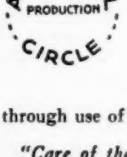
"Tommy Tucker's Tooth" (35 m.m. and 16 m.m.), 15 minutes. Synopsis: The "Tell-a-Story-Lady" narrates to a group of children the importance of keeping teeth in good condition. Animated scenes used effectively.

"Clara Cleans Her Teeth" (35 m.m. and 16 m.m.), 15 minutes. Synopsis: Clara, aged 10, always neglected her teeth until she learned, through her playmates, the importance of daily brushing and care. Interesting story which impresses lesson effectively.

"Tommy's Troubles" (35 m.m.), 20 minutes. Synopsis: On oral hygiene. Emphasizes importance of diet as well as cleanliness in care of teeth; shows proper method of brushing them.

"Bobby's Bad Molar" (35 m.m. and 16 m.m.), 15 minutes. Synopsis: Bobby has neglected his teeth and is paying the penalty by doing poor work in school, being backward in athletics, etc. One day his teacher sends him to the school dental hygienist, who examines his teeth. The hygienist explains Bobby's teeth troubles to him and urges him to go to the dentist at once and receive attention. Bobby takes her advice and finally becomes an enthusiastic advocate of the proper care of teeth.

"Life of a Healthy Child" (16 m.m.), 15 minutes. Synopsis: Illustrates healthful activities of a normal school child. Habits of cleanliness, correct diet, carefree play, visits to dentist and physician are emphasized. Excellent for parent-teacher groups or child audiences.



"Ask Your Dentist" (35 m.m. and 16 m.m.). Excellent for high school and adult groups. Stresses the importance of diet, cleanliness and dental attention. A touch of humor is added by the use of cartoons.

"How Teeth Grow" (16 m.m.), 15 minutes. Synopsis: Eastman classroom film for health education. Shows in interesting and instructive manner growth and development of temporary and permanent teeth. Demonstrated through use of animation, models, and subjects of various ages. (For children and adults.)

"Care of the Teeth" (16 m.m.), 15 minutes. Synopsis: Eastman classroom film for health education. Shows various phases of care of teeth such as diet, care by dentist, brushing and home care. Useful in giving fresh support to activities of dental hygiene program. Designed for individuals above fourth grade.

Technical Film: *"The Physiology of Mastication"* (16 m.m.); 2 reels. Synopsis: Study of jaw movements of various animals exhibiting types of mastication as an introduction to study of human beings. Animated skulls and cartoons are synchronized with mandibular movements of animals. The film shows that "three point contact" and "bilateral balanced occlusion" never occurs in lower animals during process of incising and chewing tough resistant food.

Technical Film: *"Mechanics of Balance in Dental Prosthesis"* (16 m.m.); 1 reel. Synopsis: Depicts clinical application of unilateral balance to prosthetic dentistry. Film is a continuation of the above-mentioned film, *"The Physiology of Mastication."*

Technical Film: *"Uses of Gelatin in Dental Arts"* (16 m.m.); 2 reels.

"Nature—Builder of Teeth" (16 m.m.); 1 reel shows the development of teeth from birth to adulthood. Explains the part played in facial development by the erupting forces of teeth; also effect of nutritional disturbances and illness on tooth development; mottled teeth, normal and abnormal occlusion, are portrayed. Written lecture accompanies film. Can be purchased for $25.00, or rented for usual rental fee.

47. LANTERN SLIDE SERVICE

Lantern Slide Lectures:

"The Tooth Question," lecture (for adult audiences); 42 slides. (Requires one hour to present.)

"The Mouth and Its Message," lecture (for adult audiences); 13 slides. (Requires thirty minutes to present.)

"Every Child's Treasure," lecture (for school children of first six grades); 31 slides. (Requires thirty minutes to present.)

"The D. Kay Brownies," lecture (for school children of first four grades); 10 slides. (Requires twenty minutes to present.)

"The Teeth and Their Care," lecture (for school children of fifth to eighth grades); 12 slides. (Requires about thirty minutes to present.)

"Your Teeth," lecture (for school children of fifth to eighth grades); 40 slides. (Requires about one hour to present.)

"Pyorrhea," lecture (for adult audiences); 2 slides (with six illustrations per slide). Requires about fifteen minutes to present.

"The Talking Tooth," lecture (for adult audiences); 2 slides (with six illustrations per slide). Requires about fifteen minutes to present.

"Nature, Builder of Teeth," lecture (for adult audiences); 17 slides. (Requires about thirty minutes to present.)

Note: Copies of the foregoing lectures are furnished free, although a small rental fee is charged for the slides (see lantern slide service).

"Johnny Don't Care's Teeth" (for fourth to eighth grade children); 22 colored slides. Self-explanatory; no written lecture necessary.

Lantern Slide Rental Service:

The Bureau has a large collection of slides (standard size, 3¼ by 4 inches) suitable for professional and lay groups. A complete list of these slides will be furnished on request. Any selection of slides may be rented on the basis of $1.00 a day or $3.00 a week, plus shipping charges both ways. No charge is made for time in transit or time spent in review. In requesting slides (provided you do not order from our list), please state the topics that you desire to cover, type of audience, number of slides, when wanted and length of time desired. The renter is held responsible for all breakage.

Lantern Slide Sales Service:

The Bureau will sell duplicates of any stock slides at the following prices: plain slides, 35c each; colored slides, 75c each. On request, the Bureau will prepare slides from photographs or cuts on the following basis: *plain slides:* negative, 25c; slide, 35c; making total cost for each original slide 60c; *colored slides:* negative, 25c; slide, 75c; making total cost for each original slide $1.00. *Remittance must accompany all orders.*

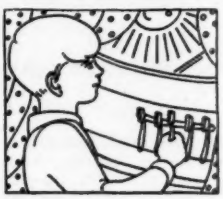
A BENEFICIAL PRODUCTION CIRCLE

48. FIRST GRADE DENTAL EDUCATIONAL LEAFLETS

GO TO THE DENTIST AT LEAST TWICE A YEAR

The dentist is my friend.
He helps me to have nice teeth.
I go to see him often.
Sometimes teeth have little holes in them.
If there are little holes in my teeth
the dentist will fill them.
He will help me to keep my teeth clean.

BRUSH YOUR TEETH TWICE A DAY



Here are our tooth brushes.
They are hanging in the sun.
The brushes are all small.
They have pretty colored handles.
The one with the yellow handle belongs to my mother.
The one with the green handle belongs to my father.
The one with the blue handle belongs to my sister.
The one with the red handle belongs to me.
I brush my teeth every night.
I brush my teeth very morning.

TOOTH BUILDING FOODS

Milk helps to build strong teeth.
Dark bread helps to build strong teeth.
Dark cooked cereals are good foods to build teeth.
I eat cereal and milk for my breakfast.
I sometimes have toast for my breakfast.
My teeth need milk and cereals.

This new series of six leaflets designed for first grade dental education is now ready for distribution. Each lesson is printed on 8 by 11 inch drawing paper. The wording is fitted to first grade vocabulary. The text is scientifically correct. The drawings are simple and artistic. After each lesson is learned, the drawings are to be colored by the child. This material will enable educators to coordinate the teaching of dental health with that of art and reading.

One set of six leaflets, 5 cents. Twenty-five sets of leaflets, 50 cents.

TOOTH BUILDING FOODS

I will color the cabbage green.
I will color the oranges.
I will make the apples red.
I will color the spinach green.
I will color the tomatoes red.
Fruits and vegetables help to build strong teeth.

CHEW FOOD WELL

I run and play to make my muscles strong.
Exercise makes strong muscles.
I chew crisp foods to make my teeth strong.
Exercise makes strong teeth.
Crisp toast and crusts are good foods
to exercise teeth.
Celery and apples are crisp foods to exercise teeth.
My teeth need exercise.

NO CANDY BETWEEN MEALS

Candy and sweet foods do not build teeth.
I eat candy or cake or pudding after my meal.
First I eat the foods that build my teeth.
Then I eat sweet foods.
I sometimes eat candy and sweet foods
after I have eaten foods that build my teeth.
Candy does not help to build teeth.

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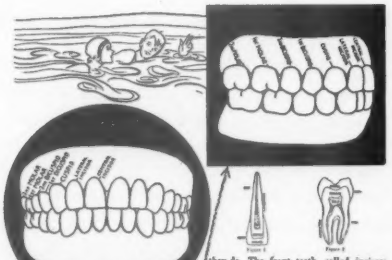
49. FOURTH GRADE DENTAL EDUCATIONAL BOOKLET

HAPPY DAYS WITH JACK AND JOAN

Jack and Joan are twins. They were twelve years old their last birthday. They have never had a single day of sickness. People who know them say they are the peppiest and liveliest children in town. They are never idle a minute. In the summer, they love to swim, ride and play tennis. In the winter, they enjoy skating, coasting and skiing. They are as happy and healthy as twelve year old children can possibly be. Both the winter and summer months are crowded with happy days for Jack and Joan. There are several reasons for these happy days which they learned from Uncle Dan. One of these reasons is told and pictured on the inside pages of this book. Color the pictures with crayon or water colors as you read the story of Happy Days.

Approved by
THE AMERICAN DENTAL ASSOCIATION and the UNITED STATES PUBLIC HEALTH SERVICE

Illustrated by
THE BUREAU OF PUBLIC RELATIONS, AMERICAN DENTAL ASSOCIATION
211 E. Superior St., Chicago, Ill.



At twelve years of age, the twins have twenty-eight permanent teeth. This is a side view of a set of teeth like Jack's and Joan's. Notice that the upper and lower teeth fit together properly like this ⌒⌒⌒⌒⌒.

Several of their classmates have lost some of their teeth. They must grind their food with a chewing machine that fits together like this ⌒⌒⌒⌒⌒.

This is a front view of a set of teeth like Jack's and Joan's. When the twins are about 18 or 20 years old, four other molar teeth, commonly called "wisdom teeth," will appear. Jack and Joan then will have their full set of thirty-two permanent teeth.

Notice the shapes of the teeth. The teeth are shaped differently because of the work they do. The front teeth, called incisors, have sharp edges to cut the food. The teeth at the corners of the mouth, called cuspids, have a sharp point or cusp to tear the food. The teeth just back of the cuspids, called bicuspids, have two points or cusps to crush the food. The back teeth called molars, have several points or cusps to grind the food. Every tooth has a crown and root. The front teeth have one root and the lower molar teeth have two roots. The upper molar teeth have three roots. The crowns of the teeth are covered with very hard material called enamel. The enamel protects the teeth from injury. The roots are covered with a thin material called cementum. The body of the teeth is made of a bonelike substance called dentin. In the center of each tooth is a hollow space called the pulp chamber, which contains the pulp. The pulp is made up largely of blood vessels and nerves. Figure 1 shows the different parts of a front or incisor tooth. Figure 2 shows the different parts of a lower molar tooth.

Uncle Dan told Jack and Joan a third secret that would help them to have good teeth. He said they should keep their teeth clean. He told them to use a small sized toothbrush. The bristles of the brush should be set far enough apart so that they can easily be cleaned. They should be of medium stiffness and of uneven length. Uncle Dan told them to use a tooth paste or powder that does not contain any harsh grit or strong medicine that will injure the enamel or hurt their gums. He told them to brush their teeth at least twice a day, after breakfast in the morning, and before going to bed at night.

This is the way Uncle Dan taught Jack and Joan to clean their teeth: Hold the jaws slightly apart. Brush the teeth of each jaw separately. Place the bristles of the brush on the gums above the upper teeth and brush down from the gums to the chewing surface. This downward movement brushes the food from between the teeth. It also massages the gums. Never brush across the teeth, because this will not remove the food from the crevices and moreover, may injure the gums. The lower teeth should be cleaned in the same way as the upper teeth. The brush should be placed on the gums below the teeth and drawn upward to the chewing surface. Brush the inside surfaces of the teeth as well as the outside surfaces. Do not fail to brush the chewing surfaces of the teeth as these uneven surfaces easily catch and hold particles of food.

If the twins' mother swept in circles, she would not get much dirt off the kitchen floor. By sweeping with long, even strokes, she removes the dirt easily. So it is with brushing the teeth. We should brush the upper teeth with a downward sweeping motion, and the lower teeth with an upward sweeping motion. This will remove any small food particles that might lie between the teeth. After thoroughly brushing the teeth, the mouth should be rinsed by forcing a mouthful of water several times between the teeth.

DENTAL HEALTH EDUCATIONAL MATERIAL FOR FOURTH AND FIFTH GRADE CHILDREN

Happy Days with Jack and Joan is an eight page booklet on the care of the teeth which has been especially designed for children between the ages of nine and eleven.

The names, structure and function of the teeth, as well as the fundamentals of dental health, are explained in an interesting, yet simple manner. The text is scientifically correct. The illustrations are modern and artistic. After each lesson is learned, the illustrations can be colored by the child. This booklet will enable educators to coordinate the teaching of dental health with that of art and reading.

Approved by educators, the American Dental Association and the United States Public Health Service.

Single booklet, 5c; sets of 35 booklets, 2c each.

50. EXHIBITS

The American Dental Association offers the following list of mechanical exhibits. Each exhibit rents for $2.00 per week, plus shipping charges to and from Chicago.

E-1. Mechanical clown, operated by an electric motor which moves the head, eyebrows and hands. Fourteen 8 by 11 inch cards containing dental messages are lifted into view one after the other by the clown's hands. Wt. 100 pounds.

E-2. Four-foot stage upon which are mounted a number of small cutout figures representing bad teeth, a dentist, a toothbrush, tooth paste, vegetables, milk and fruit. Figures are mounted on a concealed endless belt motivated by an electric motor. Figures move from left to right across the stage, thus creating effect that they are chasing the decayed teeth away. Wt. 75 pounds.

E-3. Fourteen inch revolving parchment drum upon which are painted figures of a dentist, fruit, sunlight, vegetables, milk and tooth paste. Drum revolves from left to right. Motivated by heat from a large electric light. Wt. about 50 pounds.

E-4. Two illuminated pictures, 18 inches square; a boy with a good profile, which when illuminated from behind shows an even set of teeth; and a boy with a poor profile, which when illuminated from behind shows irregular, broken down teeth. Illuminated by means of flash buttons. Wt. approximately 35 to 40 pounds.

E-5. A large cardboard cutout view of a class room, 5 feet long by 3 feet high, showing a blackboard in the background upon which is printed different dental health lessons. Cutout figures of teacher and children are placed before this background. Shipped in fibre case. Wt. about 25 pounds.

E-6. Ten large plaster models—each 18 inches in diameter. Nine models show progressive stages of dental caries and pyorrhea. One model shows child's mandible with deciduous and permanent teeth in place. Wt. 300 pounds.

E-7. Sixteen life-size wax models—showing: dentition of 6-year child; effects of thumb sucking; normal occlusion and results of loss of first permanent molar; cross section of mouth; longitudinal section of molar; destructive action of calculus and decay. Shipped in 3 cases, total wt. 200 pounds.

51. BOOKLET ON CARE OF THE TEETH

Attractive 32 Page Booklet

Approved by

THE AMERICAN DENTAL ASSOCIATION

and by

THE UNITED STATES PUBLIC HEALTH SERVICE

1 Booklet	10c
12 Booklets	$ 1.00
50 Booklets	$ 4.00
100 Booklets	$ 7.50
500 Booklets	$25.00
1000 Booklets	$45.00

In its preparation, infinite care has been used to couch all information in lay language without distorting the scientific content. **It is illustrated with eighty beautifully clear photographs of actual cases and models.** Their accompanying captions, legends and overprint enable each illustration to tell its own story. It is just the kind of book on this subject that you have been waiting for, the type of book that every mother, nurse, hygienist, teacher and health worker will want for their own use when they see it in your office.

A BENEFICIAL PRODUCTION CIRCLE

52. DENTAL HEALTH POSTERS. (See page A-35.)

THE BENEFICIAL CIRCLE PLAN
and the
DENTAL EDUCATIONAL MATERIAL

Much of the dental health educational material listed in this prospectus has been developed under the "Beneficial Circle" Plan. Other material is being developed and will be released as rapidly as the facilities and support of the plan permit.

All of the dental educational material offered by the Bureau of Public Relations is ethical, authentic and interesting. Most of the newer material will be offered to the public under the approval of the United States Public Health Service as well as the American Dental Association.

ASSIST THE BENEFICIAL CIRCLE PLAN BY USING and recommending products advertised in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION as increased advertising revenue will be used to develop further educational material.

LOOK FOR THE SIGN

ORDER BY NUMBER

The Bureau of Public Relations,
American Dental Association,
212 E. Superior St., Chicago, Illinois.

Enclosed is $_____ for Dental Health Educational Material corresponding to numbers below:

_____

_____

Name _____

Address _____

Special Notice: To assist the Bureau in eliminating unnecessary bookkeeping and correspondence, *please remit the amount of your order at the time of ordering.* Remit by post-office money order or stamps. *Please do not send personal checks for amounts of less than one dollar.*

DENTAL ECONOMICS

HEALTH INSURANCE AND OLD AGE PENSION IN DENMARK

VOLUNTARY health insurance in Denmark had developed to a unique extent, in 1933 including more than two thirds of the population (and about 82 per cent of all persons capable of being insured). The passing of the National Insurance Act in April, 1933 (effective Oct. 1, 1934) left this voluntary scheme practically unchanged.

While the Old Age Pension Law of 1922 did not call for any contributions on the part of the recipients, the new Social Reform Law provides that every person on attaining the age of 21 (and all persons between the ages of 21 and 60 on coming under the act), if not actually insured against sickness shall at least become an "inactive" member of an approved sick club or state controlled sickness insurance association. All persons applying for inactive membership must submit to the same medical examination and fulfil the same requirements as regards their state of health as those imposed on persons applying for "active" membership. Having once fulfilled these conditions, they are eligible at any subsequent date to become "active" members irrespective of their age or state of health at the time of the transfer. It was thought advisable to impose this minimum of general compulsory sickness insurance, because experience had proved that, in a great many instances, people have regretted their failure to join a club in time, thereby debarring themselves from the benefits administered by these associations. The new law therefore calls for general participation at a low rate of contribution; i.e., 2 crowns per annum. These small contributions compensate the sick clubs for undertaking the risk of having to accept such persons as "active" members at a higher age.

Under the provisions of the new law, all active or inactive members of sick benefit clubs are automatically insured against invalidism. The premium collected annually for invalid insurance amounts to 6,000 crowns for those who become members of sick benefit clubs before their twenty-first year and 7.20 crowns for those who become members after their twenty-first year.

The law also provides that the invalid pension, which becomes effective when the total earning capacity of a person is reduced to two thirds, as well as the old-age pension, which is granted from the sixty-fifth year, shall be founded upon a basic rate of pension according to sex, residence, income and capital.

The following table shows the annual benefits in the form of invalid pension or old age pension that can be granted under the new law to various categories or persons residing in various localities where the cost of living differs.

The normal rates are:

	Capital (Crowns)	Towns (Crowns)	Country (Crowns)
Couples	1,086	912	702
Single men	732	606	468
Single women	678	564	432

Persons with private incomes exceeding 200 crowns per annum for married couples, and 100 crowns per annum for single persons are not entitled to full old-age pensions. If the income is larger, corresponding deductions are made in the old age pension, in such a manner that the income plus the reduced amount of the pension never exceeds the maximum old-age pension.

The number of persons pensioned in the five-year period 1928 to 1932 averaged 99,000 and the amount expended was 60,000,000 crowns per annum.

ILLNESS AMONG RELIEF FAMILIES DUE TO UNDERNOURISHMENT

According to the *Indianapolis Times* (Sept. 14, 1935) Dr. Alice M. Parsons of Chicago charges that "American poor families receive inadequate nourishment and medical care." Quoting figures from governmental and private surveys, Dr. Parsons said the key to the American problem is diet.

"Direct federal relief does not allow families enough money for food budgets, and the resulting undernourishment is the soil in which tuberculosis flourishes. . . . There is 46 per cent more illness in families on relief than in nonrelief families," she said. "In the next ten or fifteen years, we will probably have an increase in tuberculosis as was seen in Europe following the world war."

Dr. Parsons stated that socialized medicine and compulsory health insurance offered partial solutions to this problem.

If this news item is correct, Dr. Parsons believes that the evils of illness resulting from the inadequate food furnished the indigent by the government can be corrected by furnishing them government paid medical and dental aid. Admitting that the food furnished by the government is so inadequate as to produce wholesale illness, Dr. Parsons optimistically believes that health service furnished by the government will be so adequate as to overcome and correct the evil. Unfortunately, many advocates of compulsory health insurance and socialized medicine base their arguments upon the same unsound premise.

REGIMENTATION AND BUREAUCRACY

Dr. Alfred P. Sloan, Jr., commenting on the Supreme Court decision anent the NRA, said, among other things: "Sooner or later we are bound to recognize that regimentation and bureaucracy have no part in our national economy. They can only produce one result—lowered efficiency, increased costs, and reduced standard of living." And that goes double for any attempt to socialize medicine or to regiment the profession in a compulsory health insurance scheme.

Sen. William E. Borah says: "With bureaus or departments, the appetite increases with what it feeds upon. It is well to remember that the taxpayer is the same for the state taxes as for the federal government. It makes little difference whether one government, the state or the federal, imposes the tax. There is only one people to take care of both taxes. We should not expend a dollar, nor impose a single item of expense upon the people of this country, until relief from taxes is in sight."

Attorney General Crim says: "The department of justice is staggering under the load imposed by sumptuary and police laws—laws that within all common sense fall within the natural sphere of local governments. Unless there is a halt in this tendency to saddle all responsibilities on the federal government, the time will come when we will have in Washington a bureaucracy knowing no master—and one day the country will be in ruins."

Charles Evans Hughes, when he was Secretary of State, told the members of the American Law Institute in convention at Washington: "We have in this country the greatest law factory the world has ever known. Forty-eight states and the federal government are turning out each year thousands of new laws, while, at the same time, the courts in the performance of judicial duty are giving us thousands of precedents—175,000 pages of decisions in a single year, an average of 12,000 or more statutes every year, and an annual average of 13,000 or more permanently recorded decisions of highest courts."

The danger which every republic should fear is over-centralization, with the subsequent substitution of domination by one man for the rule of the people. Germany is the historic symbol of absolutism. We have recently concluded a war, undertaken, we are told, that democracy might not perish from the earth. If this is true, to attempt to centralize in Washington the management of affairs that belong rightfully to the respective states is to create a system that cannot but destroy democracy among our people by betrayal of principles which are the fundamentals for the maintenance of government.

The centralization of power, whether in industry, commerce, education or the trades or professions or other factors entering into affairs of our everyday life, amounts to this: that if we grant to an individual the power to make standard or be the sole authority to revise, abolish or fix conditions under which the people of the future have to live, work and be educated, we set up an oligarchy which will create and foster bolshevism.—*Illinois Medical Journal*, September, 1935.

SCHOOLS DEBATE "SOCIALIZED MEDICINE"

For the past nine years, the Committee on Debate Materials and Interstate Cooperation of the National University Extension Association has selected a topic of national importance for university and high school debating teams. This year, the subject chosen was socialized medicine. Volume I of the ninth annual debate handbook for 1935-1936, edited by Bower Aly and published by Lucas Brothers, Columbia, Mo., contains fourteen articles dealing with the pros and cons of this subject.

This year, as in the past two years, the requirements of the organizations sponsoring debates in the several states have made necessary the issuance of a second volume supplementing Volume I of the debate handbook. The second and supplementary volume contains twenty-three articles dealing with different phases of this highly controversial subject grouped under seven headings or sections.

Articles in Section 1 deal with the general considerations bearing on socialized medicine; Section 2, the background of socialized medicine; Section 3, arguments for socialized medicine; Section 4, arguments against socialized medicine; Section 5, the economics of medicine in foreign countries; Section 6, alternative plans for medical care; Section 7. medicine today in the several states.

As may be supposed, the handbook and its supplement, Volume II, quotes freely from articles by many well known writers on the subject, such as Sir Arthur Newsholme, John Kingsbury, Sir Henry B. Brackenbury, Herbert E. Phillips, Morris Fishbein, Hugh Cabot, Ralph H. Pins, Edwin F. Patton, R. G. Leland, Michael M. Davis and Abraham Epstein.

Primarily, the 1935-1936 debate handbook has been edited and printed for the use of those university and high school debating teams that choose the subject of medical economics as a topic for debate, but every student of this subject will find the books worthwhile. As stated by the editor, Bower Aly, the purpose of the debate handbook is to assist the debater in establishing a point of contact with the controversy which now goes on all about us in the field of medical economics.

During the coming winter, thousands of university and high school debating teams,

prompted by the Committee on Debate Materials and Interstate Cooperation National University Extension Association, will thrash out the problem of socialized medicine. Already, a number of schools have announced their intention of debating this subject, as evidenced by the following:

"State Medicine is to be Debated Topic of School Speakers"

Lincoln, Nebraska, August 31st.

"Free medicine service for all citizens will be discussed by Nebraska High School orators this year.

"The debate question for 1935-36 announced by the Nebraska High School Activities Association is, 'Resolved that the several states should enact legislation providing for a system of complete medical service available to all citizens at public expense.' "

Dr. John Sheehan, in the October *Bulletin of the Omaha-Douglas County Medical Society-Omaha District Dental Society,* has this to say on the subject: "This is a nationwide movement which means that this same question will be a national subject for debate. It is evident from the above quotation that the public is going to learn plenty about the conduct of medical and dental practice. We must admit, too, that the rank and file of the people are in receptive frame of mind where there is a possibility of being relieved of the burden of medical and dental bills. If the affirmative is upheld in the majority of cases, organized medicine must shoulder the burden of proof and vindicate the profession in the eyes of the public. Regardless of how judges rule in debate the public at large have ideas of their own and things they hear and see in print often have an unfavorable reaction."

THE INDUSTRIAL WORKER'S INCOME

The following figures taken from the *United States News* for Sept. 30, 1935, are quoted because they are of vital interest to every practicing dentist:

"Wages today are 2.2 per cent higher than in 1929.

"Wages today are 21.8 per cent lower than in 1929.

"Strangely enough, both these statements are true. The 'catch' is that the wages that are higher are those paid for an average hour of work. The wages that are lower are the wages paid for the average week of work.

"The figures apply to 25 industries reporting to the National Industrial Conference Board. Wage scales in these industries are slightly above the average for the country as a whole, but the Department of Labor reports that the same trends appear also in the figures collected by the Department.

"What is the explanation of the paradox of rising hourly pay and lower weekly pay?

"Simply this: The hours worked each week on the average are now considerably fewer than in 1929. The average in the industries tabulated is 37.2 hours; in 1929 it was well above 40.

"Throughout the whole of 1929, the workers received on an average 59.9 cents an hour. In the following year each 60 minutes of working time netted even more—59 cents.

"Then after five years of the greatest depression within living memory, an hour's labor was bringing 60.1 cents. That is the situation today.

"The story is different when weekly wages are counted up.

"In the boom year of 1929, the worker's weekly pay envelope contained $28.50. The year 1930 saw this cut to $26. Today it stands at $22.28.

"This average takes no account of those who are unemployed. It refers solely to employes who are actually on the payroll. Consequently it reflects a considerable amount of part-time work.

"In other cases it reflects a shorter standard work week. The NRA codes called for

the 40-hour week in many industries, and the practice established under the codes has continued to be the practice in most of the large concerns. So NRA studies to date indicate."

Just where the dental income fits into this picture is not definitely known. All things being equal, it would indicate that, after six years of depression, the dentist's income is steadily decreasing. On the other hand, the back log of dental defects which have accumulated during these same years has reached the point where people are being forced to have corrections made even though it means curtailing expenditures for other and sometimes nonessential commodities, such as cosmetics, confections and movies.

Statistics presented in the same issue paint a more optimistic picture of the economic situation in the rural areas.

"Farm income in August rose to $593,000,000, as compared with $471,000,000 in July and $608,000,000 in August a year ago. Last year Government purchases of drought-stricken cattle brought up the total. Checks to farmers from processing tax funds accounted for $44,000,000 in August, against $20,000,000 in July and $54,000,000 last year.

"More and more big industries report plans to spend large sums for expansion of their plants.

"Financial markets continue to revive. The rate at which industry is turning old high-cost debt into new low-cost debt impresses officials. They look for this process soon to turn into a demand on the part of industry for new money to be used in expanding operations. When that demand appears and the public starts once more to invest its funds in industrial enterprises, New Dealers will be convinced that the depression is being left behind.

"Gold continues to flow rapidly into the United States. It is near the $1,000,000,000 mark for the present year, after passing $1,000,000,000 last year. The base is laid for a huge currency or credit expansion."

DENTAL HYGIENE INCLUDED IN HEALTH EDUCATION

The Department of Health Education of the Omaha Public Schools has included dental hygiene in the program for the coming year. This step is an important one in health education and we are grateful to the board of education and the department of health education for their splendid cooperation in striving to bring about better health conditions in our schools. By standing with a solid foundation we are bound to produce a more durable structure. This applies to the human structure as well as to man-made structures.

The boy or girl who knows the value of sound healthy teeth and how to care for them is bound to be healthier and happier than the dental cripple. At the present time there are 86 per cent of school children in need of dental attention. After dental hygiene has been taught for a few years another survey would show different results. The plan, which is to be put into operation in September, has the endorsement of the Council of the Omaha District Dental Society.—*Bulletin, Omaha-Douglas County Medical Society —Omaha District Dental Society,* September, 1935.

DENTAL PROSPECTS*

POPULATION OF U. S.

In 1850, the population of the United States was slightly more than 20,000,000. In 1890, it had grown to 63,000,000. In 1910, it was 92,000,000, and in 1930 it was 123,000,000. We begin to realize just what has taken place when we stop to think that, in our

*Statistics courtesy of American Dental Trades Association.

lifetime, the population has practically doubled. By the most conservative estimate, we will have a future growth of a million a year and will reach a total of at least 150,000,000 by 1950. As some estimates are as large as 1,700,000 per year, an increase in the number of people needing dentistry during the next twenty years may be anticipated.

DENTAL GRADUATES

The following table shows the number of dental graduates from 1921 to 1931 and the estimated number until 1935, as computed from the known number of students in dental colleges:

1921—1,795	1929—2,442
1922—1,765	1930—1,561
1923—3,271	1931—1,900
1924—3,422	1932—2,000
1925—2,590	1933—1,875
1926—2,610	1934—1,832
1927—2,642	1935—1,823
1928—2,563	

There has been a rapid decline since 1924. Freshman classes this year are small, and they are not likely to be much larger for the next year or two unless economic conditions show great and immediate improvement.

TREND OF NUMBER OF DENTISTS

There were 62,584 dentists in 1928 and 58,004 in 1931, a decline of about 4,500 in three years. It is estimated that about 1,974 dentists die or discontinue practice each year. This figure of 1,974 is in excess of the total number of dentists that will be graduated each year during the next several years. It should also be borne in mind that many who graduate go to foreign countries, and some never enter practice at all.

CURRENT LITERATURE

Effect of Vitamin D on Calcium Content of Dentin: Controlled clinical experiments seem to indicate that therapeutic doses of vitamin D will both prevent and arrest dental caries when the lesions produced are apparently due to vitamin D or calcium deficiency. (Mellanby, May: Diet and the Teeth: III. The Effect of Diet on Dental Structure and Disease in Man, Special Reprint Series, Med. Research Council 191, 1934.) It is assumed in explanation that the vitamin will increase the calcium content of the dentin and that such an increased calcium content will prevent or arrest caries. In a recent report, Fish (Fish, E. W.: The Effect of Vitamin D on the Calcium Content of the Dentin, J. Physiol., 84:272 [June 18] 1935) records an unsuccessful attempt to alter the calcium content of the dentin of dogs by giving heavy doses of vitamin D and calcium over a prolonged period of time. Three dogs from the same litter were used in his observations. Two teeth were excised from each animal at the beginning of the feeding experiment and the two symmetrically opposite teeth were removed at the end. A specimen of the dentin was prepared from each tooth and analyzed. Each specimen was freed mechanically from pulp tissue and from enamel and cementum and was prepared from the cervical part of the tooth. The pieces were dried at 105 C. for eighteen hours. This dry weight was therefore taken as a basis for calculation and the calcium content was expressed as the proportion of calcium oxide to this weight. The basic diet of raw meat, hounds' meal and water was continued with all animals, but calcium and large doses of vitamin D for varying pe-

riods were added. This regimen almost doubled the normal calcium content of the blood. Roentgenograms showed marked increase in opacity of the bones, but no apparent change in the teeth. The chemical analysis of the dentin gave no significant increase in calcium content as compared with the preexperimental period. Definite as are these results for the period of about seventy days in dogs, the case against vitamin D cannot be considered definitely closed. The fact that a dog has a lower calcium content of dentin than man and that he is absolutely immune to dental caries raises the question as to whether the mechanisms involved are entirely similar physiologically. Doubt is thus thrown on the reliability of the fundamental assumption that caries is dependent on the calcium content of the dentin alone. Furthermore, caries is generally of slow development and it may be necessary to carry the crucial investigations over a period of years rather than of weeks.—*J.A.M.A.*, 105:1042 (Sept. 28) 1935.

Malignant Growths of Antrum: How frequently do malignant growths of the maxillary antrums occur, as determined clinically and radiographically? References on epiphyseal development in standard anatomy textbooks do not coincide in all age periods as checked by roentgen examination. Have any comprehensive roentgen studies been made recently? Malignant growths of the antrum are relatively infrequent. The number of this type of new growth as compared with the total number of patients frequenting several of the world's largest nose and throat clinics gives figures varying from 0.03 to 0.12 per cent. Another source states that malignant neoplasms of the nose and its accessory cavities represent about 1 per cent of all malignant growths and about 1 in 800 of all cases of nasal disease. A search of the literature does not reveal any roentgen studies of the maxillary sinus devoted solely to the discovery by this method of the incidence of carcinoma in this region. Perhaps, one answer to the question would be the statement of one authority (Oehngren), who feels that "a more widespread use of x-rays for diagnosis in the case of pains in the trigeminal nerve area and a more general use of them in unilateral subacute rhinitis in those over the age of 50 would result in a smaller number of overlooked tumors of the antrum. Too many of them in the past have been going about for months with a diagnosis of neuralgia or toothache." There is no exact agreement on the question of epiphyseal development because of normal variations. In general, the anatomists agree and their observations coincide more or less with those of the roentgenologists (Cohn, Isadore: Normal Bones and Joints, New York: Paul B. Hoeber, Inc., 1924).—Queries and Minor Notes, *J.A.M.A.*, 105:989 (Sept. 21) 1935.

Calcium in Child's Diet: It is my understanding that a quart of cow's milk contains approximately a gram of calcium and that this is considered the desirable amount for a growing child. Kindly answer or discuss the following questions: 1. How much calcium does a liter of human milk contain? 2. At different ages or different periods of growth do children require different amounts of calcium? Specify. 3. Is the ratio between calcium and phosphorus the same in cow's milk as in human milk? In the following questions it is understood that the hypothetic child is receiving an adequate supply of all the known vitamins and especially vitamin D. 4. If a healthy normally growing child between the ages of 2 and 14 years drinks a pint of milk each day and eats a good general diet containing liberal amounts of green vegetables and fresh fruits, is additional calcium indicated? 5. In the case of a healthy, normally growing child who drinks only a few ounces of milk each day or even none at all but who eats well of a normal and well balanced diet, should additional calcium be prescribed? 6. When additional calcium is necessary or desirable should it be administered in a form in which the calcium-phosphorus ratio is the same as in human milk? Name one or more such preparations and their relative merits. Is the calcium of some preparations more readily ionizable than that of others? 7.

Discuss the merits or demerits of dicalcium phosphate, tricalcium phosphate, calcium lactate, calcium gluconate and calcium carbonate. 8. Is there any advantage in incorporating a calcium salt with cod liver oil? If so, which calcium salt should be preferred? In discussing the various calcium salts, please state the comparative costs of the various preparations, bearing in mind that a child with subnormal calcium intake in his diet might require medicinal calcium over a period of years. *Answer:* 1. A liter of human milk contains about 1.24 gm. of calcium. 2. The only way that this question can be answered is by a study of calcium and phosphorus metabolism experiments. Sherman has summarized the data from the literature and his table is here given.

AVERAGE CALCIUM AND PHOSPHORUS STORAGE OF CHILDREN, IN GRAMS PER KILOGRAM DAILY (SHERMAN AND HAWLEY)

Age	No. of Cases	Intake	Output	Balance
Calcium				
1- 6 months	32	0.090	0.063	+0.027
7-12 months	14	0.137	0.098	+0.039
1- 2 years	5	0.089	0.070	+0.019
3- 8 years	13	0.039	0.028	+0.011
9-14 years	14	0.027	0.018	+0.009
Phosphorus				
1- 6 months	11	0.075	0.058	+0.017
7-12 months	5	0.115	0.087	+0.028
1- 2 years		.....	.....	.....
3- 8 years	10	0.054	0.046	+0.008
9-14 years	11	0.039	0.029	+0.010

From a perusal of this table it is evident that the ratio of retained calcium to retained phosphorus alters with age. In the young child calcium is retained in excess while in older children phosphorus is retained in excess. From such a table it can be further stated that it is difficult to define calcium requirement without defining phosphorus requirement. A third variable is the exact amount of vitamin D in the diet. 3. The ratio of calcium to phosphorus in breast milk is about 2:2; in cow's milk, 1:3. 4. No, if his calcium metabolism is positive. 5. No, if his calcium metabolism is positive. It might be added, however, that absorption of calcium from milk is said to be greater than from other sources. 6. It has already been shown that as the child grows older the ratio of absorption varies and that therefore it would seem fair to say that the optimal calcium-phosphorus ratio would vary with age. The calcium of some preparations is more readily utilized than that of others. 7. From what has been said, the questioner should be able to draw his own conclusions as to the merits of the preparations mentioned. The various preparations are discussed in New and Nonofficial Remedies. 8. There is no advantage in incorporating a calcium salt with cod liver oil.—Queries and Minor Notes, *J.A.M.A.*, 105:987 (Sept. 21) 1935.

Pupillary Changes After Dental Nerve Blocking: It has recently been brought to my attention by two of our local dentists that they noticed certain pupillary phenomena following nerve blocking for extraction. One dentist has found an almost immediate dilatation of the pupil on the side of the injection when 1 c.c. of 2 per cent procaine hydrochloride solution was injected into the mandibular branch of the fifth nerve. Another dentist informed me that he has found it to occur after injection into the palatine branch of the second division. My purpose in writing is to learn if possible the exact mechanism that takes place. It is known that through anastomosis the fifth nerve is involved in the sympathetic fibers to the iris controlling the dilator muscles, but I would expect procaine injection to have the opposite effect. Whatever interpretation you should put on this I should be very glad to have in view of the fact that I am going to discuss pupillary changes at a medical meeting. *Answer:* The dilatation of the pupil on the side of injection of procaine hydrochloride into the second or third divisions of the fifth nerve may have one of the following explanations: Infiltration into the mandibular or maxillary branches of the fifth nerve extends along the sheaths into the gasserian ganglion, irritating the sympathetic fibers along the ophthalmic division of the fifth

nerve and causing the pupil to dilate. Another explanation is that of Rochat, who obtained evidence of the existence of pupilloconstrictor fibers running in the fifth nerve of rabbits. Therefore, paralysis will cause dilatation. On the other hand, Magitot believes that vasodilator impulses known as antidromic are present in the fifth nerve. Stimulation causes constriction of the pupil as the result of engorgement of the capillaries in the iris, whereas paralysis would cause a vasoconstriction and dilatation of the pupil.—Queries and Minor Notes, *J.A.M.A.*, 105:1211 (Oct. 12) 1935.

Endocrine Studies in Children (By M. B. Gordon and L. Kuskin, J. Pediat., 7:89 [July] 1935): Gordon and Kuskin present a statistical study of the time of onset of teething, walking and talking in endocrine disturbances and of the relationship of intelligence to the developmental rate. Of 570 children studied, 369 presented evidence of endocrine disturbance and 201 manifested some degree of mental retardation without any sign of endocrine dyscrasia. The endocrine group is almost evenly divided into those with normal intelligence and those with mental retardation. 1. The time of onset of teething, walking and talking depends on four factors: the functional activity of the thyroid and of the growth hormone of the anterior pituitary lobe; nonendocrine factors, such as racial stock, familial tendencies, chronic conditions (such as rickets), acute infections; the mentality of the infant in the first six months of life, and the chronological relationship between time of inception of the influencing factor (endocrine or nonendocrine) and the normal time of teething, walking and talking. 2. In a mentally normal child, the time of onset of teething, walking and talking may serve as a criterion of endocrine function. Delay in the appearance of one or all indicates endocrine disturbance, provided all possible nonendocrine factors are excluded. 3. In a mentally retarded child, the time of onset of teething, walking and talking cannot be considered a diagnostic criterion of endocrine disorder. 4. Teething is within normal age limits in mentally normal children with adiposogenital dystrophy, thyropituitary obesity and hypothyroidism. In the pituitary group there seems to be a relationship between the time of onset of teething and general growth. Dentition is delayed to the greatest extent in anterior pituitary deficiency of growth and in childhood myxedema. Premature teething was noted in 22.4 per cent of the pituitary cases. The time of eruption in hypothyroidism depends on the relationship between time of inception of the dyscrasia and normal teething time and also on the mentality of the infant in the first six months of life. 5. Unaided walking appears in mentally normal infants at about the same average time in all endocrine conditions except hypothyroidism, in which there is a slight delay. 6. The onset of talking is within normal limits in mentally normal children in all pituitary conditions and is slightly delayed in hypothyroidism. 7. Infants with mental retardation teethe, walk and talk later than mentally normal infants in the same endocrine groups. Those with mental retardation due to nonendocrine antenatal factors, such as mongolism, congenital syphilis and microcephalus, teethe, walk and talk later on the average than those with postnatal disorders, such as epilepsy, encephalitis or brain injury. Considered as two groups, children with nonendocrine mental retardation teethe, walk and talk later than those with endocrine disorders. 8. The relationship between endocrine conditions, mental retardation and delay in onset of teething, walking and talking may be as follows: All may be expressions of some common factor present during antenatal or neonatal life. The glandular disturbance may be the cause of the delayed developmental rate and/or the mental retardation. The delay may be due to the mental retardation irrespective of the existing endocrine disorder. —*J.A.M.A.*, 105:1075 (Sept. 28) 1935.

Radium Dosage in Carcinoma of the Tongue (By F. E. Simpson, Am. J. Roentgenol. & Rad. Therap., 34:63 [July] 1935): Simpson discusses the technic and dosage that he is employing in the treat-

ment of carcinoma of the tongue. The application of radium to the surface of the tongue lesion is inadequate to accomplish a clinical cure necessitating the implantation of radium or radon. In the average case of squamous cell carcinoma of the tongue with cell nests, which is radioresistant, the practice of implantation should be continued. Lymphocytic and transitional cell cancer without cell nests, which are radio-sensitive, sometimes recede greatly or even disappear for a time under the influence of surface irradiations only. It seems safer to implant every carcinoma confined to the tongue, unless it is too extensive, regardless of its pathologic type. The implantation method in general should be limited to rather small, well circumscribed, favorably situated lesions, in which there appears great probability that radium or radon may be successfully implanted in every part of the growth and in which surface irradiation or excision has been generally found to be inadequate or inadvisable. If every part of a given neoplasm can be reached with tubules and the attendant conditions are favorable, a clinical cure frequently results. If every part of a given tumor cannot be reached and the attendant conditions are unfavorable, it is unwise to subject patients to a procedure that is somewhat heroic and painful, when it does not promise complete eradication of the disease. Success in radium therapy of carcinoma of the tongue depends largely on meticulous attention to a chain of details: roentgenograms of the lower jaw and chest, syphilis and diabetes are unfavorable factors in the radium treatment of carcinoma, hygienic condition of the mouth and teeth representing foci of infection. The author prefers to delay all ordinary disinfecting measures until the growth has been treated with short, powerful applications of radium. His discussion of the technic and dosage includes biopsy, the primary lesion, indications for implantation, methods of implantation, lead tubules, pitfalls, control of pain, protection of bone, metastases, nonpalpable and palpable nodes.—*J.A.M.A.*, 105:1071 (Sept. 28) 1935.

Utilization of Calcium and Phosphorus from Various Forms of Milk and Milk Products (Martha M. Kramer and Ruth McCammon, Rep. Kan. Agr. Exper. Stat., 1932, p. 114): The percentage of calcium in cheddar cheeses is approximately ten times that in soft cheeses, while the phosphorus is slightly more than twice that of soft cheeses. The phosphorus varies according to the amount of protein, while the calcium varies with the method of manufacture. There is no significant difference between the percentages of calcium and phosphorus in the rennet and in the acid types of cottage cheese. About 20 per cent of the calcium and 37 per cent of the phosphorus of the milk are retained in the soft cheeses, while 80 per cent of the calcium and 38 per cent of the phosphorus of the milk are retained in cheddar cheese. Rats fed rations containing milk products were superior to other rats in many ways and reproduced successfully. The efficiency of the utilization of calcium from the several dairy products tested will be reported later. —*Am. J. Dis. Child., 50:749* (Sept.) 1935.

Chemical Composition of Teeth 1. Estimation of Fluorine and Fluorine Content of Normal Teeth, (J. H. Bornes and M. M. Murray, Biochem, J., 29:102, 1935): Six methods for the determination of fluorine in human enamel were compared with the following results:

Method	Per Cent Fluorine
Lanthanum method	Unreliable values
Titanium method	0.0-0.04
Zirconium-alizarin method with $CaCl_2$ ppt.	0.093
Zirconium-alizarin method with $CaCl_2$ ppt. and removal of NH_3	0.06
Ditto plus $AgNO_3$ ppt., Cl content adjusted	0.07
Ditto plus Cl and NO_3 content adjusted	0.02

Human enamel of the London area contains about 0.02 per cent fluorine and rats teeth contain 0.02-0.03 per cent fluorine.

H. C. Hodge.

Sialography (H. T. Kimm, J. W. Spies and J. J. Wolfe, Am. J. Roentgenol. &

Rad. Therap., 34:289 [Sept.] 1935): Sialography is the roentgenographic demonstration of the ducts, ductules and parenchyma of the salivary glands by means of radiopaque substances introduced into the ducts. The authors present a study of eighteen tumors of the region of the salivary glands and the use of this method as a means of diagnosis. The cases are accompanied by a final diagnosis. Lipiodal is placed in the ducts with a 2 c.c. Luer glass syringe and cannulas 1.5 cm. in length made from steel needles (Nos. 17, 18, 19 and 24). A one per cent mercurochrome solution is painted around the orifice of the duct before the entire length of the cannula is inserted. The lipiodal is injected until the patient has a feeling of discomfort in the region of the gland, usually about 1-1.5 c.c. for the parotid and 0.5-0.75 c.c. for the submaxillary gland. The authors' cases are divided into two groups based on whether there is evidence of involvement of the gland. Sialography at present is considered by the authors to be helpful, but not infallible as a diagnostic measure. Stereoroentgenograms should be used.

GRANT VAN HUYSEN.

Influence of Special Cereal Mixture on Infant Development (M. L. Blatt, Am. J. Dis. Child., 50:324 [Aug.] 1935): A group of 136 children ranging from 3 to 30 months of age were examined every two weeks for periods of from six to fifty-two weeks. One group of seventy children were fed the cereal mixture of Tisdall, Drake and Brown, which is rich in mineral elements and vitamins, at the morning meal. The other sixty-six children, of comparable ages, race and sex, received identical care and diet except that they received only common cereals at breakfast. It was noted that the children on the special cereal exceeded the control group in average weight, height and head and chest circumference. The age of eruption of the deciduous teeth was observed in most instances. The children of the special group had two teeth at the average age of 7.1 months and the control group at 8.2 months. The children in the special section had twenty teeth at the average age of 26.7 months; the control children averaging 28.3 months.

M. K. HINE.

Composition of Cartilage, Bone, Dentin and Enamel (M. A. Logan, J. Biol. Chem., 110:375, 1935): Analysis of diaphyses of femurs from six rats of various ages showed an increase in carbonate content with age, on the basis of calcium content and a corresponding decrease in phosphate. A similar study found cat bone from twelve animals to be more nearly constant in composition. Dentin and enamel, analyzed separately, from seven teeth (human, 6-65 years), showed the magnesium content of the dentin to be three to four times that of enamel (true also for dog tissues); the carbonate content of dentin being higher than that of enamel (this was not so for dog teeth). " . . . the essential equivalence of the acid and basic constituents . . . supports the contention that the bases exist in bone and dentin essentially as tertiary phosphates and carbonates." Cartilage (from nasal septums of calves, epiphyses of calf embryos) had a calcium and magnesium content three to four times that of normal blood plasma, with no such difference in phosphate. Cartilage contains about one-third as much total nitrogen and about five times as much sulphate as bone matrix. Noncalcifying cartilage contains about half the inorganic and organic phosphates of calcifying cartilage.

H. C. HODGE.

Trigeminal Neuralgia (Horrax and Poppen, Surg., Gyn. & Obst., 61:394 [Sept.] 1935): Patients often erroneously look on the radical operation of root resection as "a last resort." Facial palsy occurs in no more than 5 per cent of cases and, in most instances, clears up promptly. Likewise, a wrong impression is held in regard to alcoholic injections, as this treatment always gives many months' relief provided the nerve trunk has been injected. Dental infection, sinusitis, facial injuries, postherpetic neuralgia, sphenopalatine neuralgia, sympathetic pains and tumors can be differentiated from true tic douloureux. Rapid, successive paroxysmal stabs of pain

confined to the limits of the branch or branches involved characterize trigeminal neuralgia. Between attacks, there is always freedom from pain and discomfort. Of the authors' cases (468), 90 per cent occurred between the fortieth and eightieth years of life. Women were more frequently affected than men (60:40). The third division was the root most frequently involved. Inhalations of trichlorethylene gave some relief in about one half the group receiving this treatment (ninety patients). If trichlorethylene is not effective, an alcoholic injection is given. In cases wherein a sensory root avulsion is to be employed, an alcoholic injection is always given first in order that the patient may become acquainted with the resulting numbness of the face.

HAMILTON ROBINSON.

Sphenoid Sinus and Sphenopalatine Ganglion as Factors in So-Called Atypical Trigeminal Neuralgia (H. W. Lyman, Ann. Otol., Rhinol. & Laryngol., 44:653 [Sept.] 1935): The close anatomic relationship of the sphenoidal sinus and the sphenopalatine ganglion to the gasserian ganglion often leads to an incorrect diagnosis of tic douloureux. In this report, cases of Frazier's and Sluder's, as well as of Lyman's, are used to illustrate the ease with which these atypical neuralgia may be confused with true trigeminal neuralgia. The cases responded to cocainization of the sphenopalatine ganglion, sphenoidal drainage and cervical sympathectomy. It is shown that trigeminal neuralgia is difficult to diagnose, and thorough investigation should be undertaken before a gasserian operation in order to eliminate the possibility of an atypical neuralgia amenable to less drastic treatment.

M. W. MCCREA.

Irradiation of Carcinoma of the Lip (I. I. Kaplan and S. Krantz, Am. J. Roentgenol. & Rad. Therap., 34:381 [Sept.] 1935): Dividing cases of carcinoma of the lip into those with and those without palpable nodes, the authors show tables and discuss the advantage of surgery and irradiation alone and combined in each of the two groups. In ninety-three cases (21-83 years of age), 83 per cent were between the ages of 40 and 70; males were more frequently affected than females and chronic irritation was the most important etiologic factor, as elicited from the patients. In sixty-nine cases, Wassermann tests gave only six positive reactions. The lesion has existed over one year in 44 per cent of the cases. Papillary and infiltrating types occurred. Twelve per cent had palpable lymph nodes. In those instances without nodes, the treatment consisted of external roentgen irradiation of both sides of the neck, followed by the application of filtered radium about the lesion. A prophylactic series of high voltage roentgen irradiation is then applied. In those cases with nodes, large doses of roentgen radiation or 5 gm. radium packs are used. Residual nodes are treated with radon seeds or removable radium needles. In eighty-two instances without nodes, 88 per cent have had no local recurrence and 95 per cent have had no regional recurrence. Of eleven patients with nodes, six died. Two patients were apparently cured for six and one years, respectively, and, in the other cases, the process seems to have been arrested for six months, one year and three years. In general, results of irradiation compare favorably with those following radical surgery and with less mutilating scars.

GRANT VAN HUYSEN.

Congenital Deformities of Face (W. B. Davis, Surg., Gyn. & Obst., 61:201 [Aug.] 1935): The types of these abnormalities found in 1,000 cases are discussed, with classification, occurrence and embryologic consideration. One hundred and thirty-three involved only the lip, seventy-four the lip and alveolar process, 481 the lip and palate and 249 the palate alone. The remaining cases included rudimentary structures, mucous pits, hemangiomas and lymphangiomas. Most of these congenital deformities result from partial or complete failure of union between the processes entering into the formation of the face. Marked hereditary tendency was noted

(above 54 per cent). Consideration of shock to the expectant mother, including extraction of teeth, as an etiologic factor has no scientific basis. Clefts of the lip and palate are rare in the negro, only five cases appearing in this series. The author does not discuss surgical repair in this paper.

HAMILTON ROBINSON.

Mixed Tumors of Palate, Report of Four Cases (L. J. Davis, J. Pathol. & Bacteriol., 41:289 [Sept.] 1935): Four cases of mixed tumors of the palate which were encountered during one year in the pathology department of the University of Hong Kong are reported. They showed the structure of the more commonly encountered mixed tumors in the salivary glands; namely, a mucoid connective tissue stroma, cartilagenous cells and glandular or squamous epithelial cells.

B. G. BIBBY.

FOREIGN LITERATURE

Wire Extension in Treatment of Mandibular Fractures, R. Brooke (Brit. Med. J., 3897:498 [Sept. 14] 1935): In cases of multiple compound fractures of the mandible, a Kirschner wire is passed through the symphysis and connected over pulleys to a weight. This exerts the type of extension comparable to that used in the treatment of long bone fractures. The patient's head is fixed to the bed by means of webbing straps. After two or three weeks, when infection and edema have subsided, dental splints are fitted. This method prevents deformity in cases of severe compound fractures and allows the patients to eat soft solid foods, and is comfortable for the patients. Illustrations show the apparatus in use and the realinement of a misplaced mandibular segment.

B. G. BIBBY.

Relationship Between Chlorides of Blood and of Saliva (D. Theodorescu and H. Mathis, Ztschr. f. Stomatol., 33:271, 1935): No constant relationship between the blood chlorides and saliva chlorides could be shown. The range of blood chlorides was 308:255 mg. per cent; range of saliva chlorides, 119-31 mg. per cent.

H. C. HODGE.

Endocarditis from Diseased Teeth (E. Schulz, Zentrabbl. f. Bakt., 134:466 [Sept.] 1935): The author reports a fatal case of acute endocarditis which apparently had origin in fistulous or carious teeth. The causative organism was cultured from the teeth and recovered at necropsy. It is described as a nonmotile anaerobe morphologically resembling the influenza bacillus. Cultures did not liquefy gelatine or form hydrogen sulphide or indol, but were pathogenic for laboratory animals. The organism was considered identical with *Bacillus anaerobicus-pyogenus Buday.*

B. G. BIBBY.

Dental Caries (A. Wilcken, Progrès méd. [July 28] 1934, p. 1220): This article is chiefly a review of Bunting's work on the relationship of the bacillus acidophilus to dental caries. It is suggested that further information may be obtained from a study of the chemistry of the saliva as well as from the alimentary regimen.—*Am. J. Dis. Child.,* 50:796 (Sept.) 1935.

Action of Irradiated Ergosterol, Particularly from Point of View of Dentition (Pierron, Paris méd., 2:107 [Aug. 4] 1934): Pierron expresses the belief that in order to obtain good calcification of the teeth and to prevent dental caries, it is necessary to give phosphorus in conjunction with irradiated ergosterol.—*Am. J. Dis. Child.,* 50:752 (Sept.) 1935.

Effect of Diet on Teeth (A. Wilcken, Progres méd. [Sept. 1] 1934, p. 1374): This article purports to be a brief review of the work of May Mellanby. Two principal factors are operative in dental caries: 1. The better the teeth are formed originally, the more resistant they are. 2. Independently of their structure, the resistance is influenced directly by diet. Foods containing vitamin D, such as egg, animal tissue, milk and cod liver oil, protect the teeth; cereals, such as oatmeal and bread, are said to favor the development of caries. —*Am. J. Dis. Child.,* 50:753 (Sept.) 1935.

Variations in Glycemium Produced by Active Principle Contained in Dental Pulp (Alberico Zona, Stomatologia, 33:717-722 [Aug.] 1935): The author pursues the subject discussed by Professor Lippo on the active principle contained in the dental pulp. He uses Lippo's technic for the extraction of the principle and conducts his experiments on rabbits and dogs. He concludes that the active principle is capable of producing a slight hypoglycemia, which is present from one to four hours after the solution is injected. It has no constant action on glycosuria and glycemia of depancreatized dogs. It does perhaps reduce the glycemic and glycosuric amounts in the first days after a pancreatomy, but after that the animals die. The extract is capable of neutralizing hyperglycemia produced by suitable doses of epinephrine. T.

Treatment of Fracture of Lower Jaw (H. Meade, Irish J. M. Sci., 115:318 [July] 1935): Meade used Kirschner wires to hold the fragments in position in a fracture of the lower jaw, in which the wound on the right side of the face started behind and below the angle of the mouth and extended into the submaxillary region. It was septic and communicated with the lower jaw, which was fractured. The fracture was badly comminuted and extended from the canine to the second molar tooth. He injected the skin with a 1.5 per cent solution of apothesine. As the patient was only semiconscious, he did not consider any further anesthesia necessary. With his fingers in the mouth he pressed the fragments into position as well as he could and then drilled in two wires from the front toward the angle of the jaw, the wires crossing each other. There was no increase in the swelling of the soft tissues subsequent to this intervention. The edema decreased every day, as did the intensity of the head symptoms. Within a week the patient was perfectly conscious. The wound, however, was very septic and there was a free discharge of pus and saliva for the following three weeks. About a fortnight later a small piece of bone was removed, which was seen to be lying free in the wound. The patient had very little trouble with the wires. When he left the hospital five weeks later the wound was practically healed. The author has used the same method in another case of fracture of the jaw. This case was simpler, being a single fracture of the right side of the mandible, situated just behind the canine tooth. It was not comminuted. In the first case he had used an electric drill to insert the wires. On the second occasion he used a hand drill, so that he was unable to control the fragments with his fingers. He states that, when inserting the wire, one should try to avoid the roots of the teeth and the line of the inferior dental nerve. He recommends the use of an electric drill. —*J.A.M.A.*, 105:1225 (Oct. 12) 1935.

Odontogenous Osteomyelitis of Lower Jaw (G. I. Fodor, Orvoskepzes, 24:169, 1935): As a result of the difference in anatomic structure and blood supply of the maxilla and mandible, the latter is more often the site of this infection. It may be intradental or paradental. The cases of postextraction osteomyelitis constitute a special group. Because of the progressively more complicated anatomic relationships toward the posterior part of the mandible, the more severe cases of osteomyelitis almost always have their origin in the lower molar teeth. The incidence of infection of tooth origin is wholly independent of the incidence of dental caries. Proximity of the involved teeth to the mandibular canal is very important because of the ease of extension through this channel. The bone marrow is also an avenue of dissemination. In infancy, osteomyelitis usually develops in the maxilla; which has been explained on the basis of the greater trauma of the fixed maxilla as compared with that of the movable mandible during early life. The acute stage of the disease is treated surgically and the subsequent regeneration of the jaw bone is remarkable.—Abstr., *Surg. Gyn. & Obst.*, 61:119 (Aug.) 1935.

NEWS

CALIFORNIA

University Appointment: The University of California announcement of courses for 1935-1936 carries the announcement of the appointment of Willard C. Fleming, 1923, of Oakland, to the office of assistant dean.

ILLINOIS

Dental Advertisements Disappearing from Metropolitan Newspapers: The practical elimination of dental advertisements from the metropolitan daily newspapers is becoming evident. This is the first tangible benefit accruing from the Dental Practice Act of 1933, the constitutionality of which was recently upheld by the Illinois Supreme Court. This was made possible in a large measure by the cooperation of Mr. Kenneth Barnard, manager of the Chicago Better Business Bureau. Mr. Barnard, after a conference with Frank J. Hurlstone, chairman of the Committee on Enforcement of the Dental Practice Act, presented the facts to the publishers of the metropolitan dailies and as a result, dental copy has been practically deleted.

Dr. Giles Elected to Office: William D. Giles, of Chicago, was elected vice-president of the National Medical Association at its annual session in New Orleans in August.

Dr. La Due Guest Speaker of Creighton Dental School: October 18, John B. La Due, who was the guest of Creighton Dental School, in Nebraska during Home Coming Week, presented a postgraduate study on "The Best Methods to Overcome the Many Difficulties Encountered in Full Denture Construction."

Symposium Before Chicago Dental Society: A symposium on the present concept of focal infection was presented before the Chicago Dental Society at a meeting, September 17. The speakers were William P. Murphy, Boston, Mass., Boyd S. Gardner, D.D.S., Rochester, Minn., and Dr. Lloyd L. Arnold, Chicago, who presented the views of the internist, dentist and bacteriologist, respectively.

Unveiling of Tablet to G. V. Black at University College Dental Hospital: During the meetings of the American Dental Society of Europe, Arthur D. Black, who had gone over to take part in the proceedings, was invited to unveil the tablet which has been affixed to the bust of his father, G. V. Black, at the University College Dental Hospital, London. The dean of the dental hospital, Mr. J. L. Dudley Buxton, welcomed Dr. Black, whom he introduced to a representative gathering of English and American dentists. Dr. Black gave a short address on his father's career and his early association with the friendly Illini Indians, and expressed his gratification at being able to put the finishing touch to the bust which he had had the honor to unveil so many years before.

INDIANA

Change in Dental Educational Requirements: The Administration and Board of Trustees of Indiana University announce that, beginning with the school year, opening in September, 1937, the requirements for admission to the Dental School of Indiana University will be raised to two full years (a minimum of 60 semester hours) in the School of Liberal Arts and Sciences.

A New Publication: A new publication, *The Caduceus,* appeared recently, ascribed as the official monthly bulletin of the Fort Wayne Medical Society, the Fort Wayne Academy of Medicine and Surgery and the Isaac Knapp District Dental Society. The medical editor is Werner W. Duemling, M.D., the associate editor, H. C. Dimmick, D.D.S.

KANSAS

Advisory Committee for Health Projects: Barrett A. Nelson, Manhattan, and Forrest L. Loveland, Topeka, have been

appointed representatives of the state medical society on an advisory committee to study health projects to be undertaken with funds made available under the Social Security Act. The committee is composed of representatives from the medical, dental, hospital and nursing professions of the state.

KENTUCKY

State Medical Meeting: At the eightieth annual session of the Kentucky State Medical Association held in Louisville, September 30, E. D. Rose, of the University of Tennessee College of Dentistry, presented a paper on "What the Physician Should Know About Periodontal Lesions."

MISSOURI

Medical-Dental Service Bureau: At the special meeting of the society, September 19, the report and resolution of the Economics Committee, favoring the establishment of the Medical-Dental Service Bureau, was unanimously adopted. This means that the bureau will now be organized in cooperation with the St. Louis Medical Society and the St. Louis County Medical Society.

NEBRASKA

Health Service Now in Operation: The Omaha-Douglas County Central Health Service was incorporated August 1, and opened offices in the Medical Arts Building October 1. The new organization aims to enable persons of low income to obtain medical service at a cost within their financial means, establish a friendly doctor-patient relationship, aid the physician in the collection of fees and prevent those persons from receiving free clinic care who can afford to pay for medical service. The incorporators of the new service are Frederick O. Beck, E. H. Bruening and John Jay Keegan, all of Omaha. With headquarters in Omaha, the affairs of the corporation are to be conducted by a board of trustees made up of three members of the Omaha-Douglas County Medical Society, two of the Omaha District Dental Society, one member of the Omaha Hospital Council, one nurse of District 2, Nebraska State Nurses Association, and one pharmacist member of the Omaha Retail Druggists Association. Members of these organizations will also be members of the Omaha-Douglas County Central Health Service.

NEW JERSEY

Dr. Boots in United States: John Boots, who for fourteen years has served in the Severance Hospital, Seoul, Korea, has returned to America and is living in Princeton.

NEW YORK

Research Program at Rockefeller Institute: The Hospital of the Rockefeller Institute for Medical Research announces that diseases under investigation in its program for 1935-1936 will include aplastic, idiopathic pernicious or severe mycrocytic anemia; sprue or severe glossitis and stomatitis without anemia; nephritis in its initial stages, nephrosis, arteriosclerotic nephritis and hypertension in subjects under middle age; advanced heart failure in all age groups; early acute rheumatic fever and acute sore throat in rheumatic subjects; measles, chickenpox and encephalitis following measles, vaccinia, chickenpox, whoopingcough or the common cold, and acute lobar and bronchial pneumonia, preferably in the early stages. Physicians are to communicate by telephone or personal application to the resident physician before sending patients to the hospital.

NEW YORK

Standing Announcement of Advertising Policy of the New York Journal of Dentistry: The Publication Committee has unanimously agreed that in the future only those therapeutics, mouth washes and dentifrices that have received the Seal of Acceptance of the Council on Dental Therapeutics will be advertised in the *Journal.* Certain contractual commitments will make it impossible immediately to clear the pages of all undesirable advertisements, but as each contract expires there will be no renewal unless, in the meantime, the advertised product becomes listed as an Accepted Dental Remedy. Members of the

Society are urged to purchase and recommend only Council accepted products. In doing so they will not only protect themselves and their patients, but also uphold the American Dental Association in its efforts to eradicate packaged dental quackery.—*New York J. Dent.*, September, 1935.

OREGON

Dr. Wherry Conference Vice-President: The next meeting of the Pacific Coast Dental Conference will be held in Vancouver, B. C., in 1938. W. J. Lea of Vancouver was elected president, and Dr. O. T. Wherry, of Portland, vice-president.

Establishment of Education Course: Temple University, Philadelphia, announces the establishment of a four year course leading to a bachelor of science degree in education, with a certificate in dental hygiene. The course is designed to provide a foundation, educational and cultural, for the specialized study of dental hygiene. The first three years of the course are given in the teachers college of the university and the fourth year in the dental school. Credit for advanced standing in dental hygiene, based upon satisfactorily meeting the University's requirements, will be allowed graduates of recognized dental hygiene training schools. The establishment of the four year course does not affect the present one year course in dental hygiene, which the dental school continues to offer.

GENERAL

Resolution on Professional Relationships: At its recent annual meeting in Portland, Ore., the American Pharmaceutical Association adopted a resolution expressing "the belief that it is essential to good medical care and to the welfare of the public that the personal relation between those engaged in the practice of medicine, dentistry, pharmacy and allied professions and their clientele be preserved." The action was taken, the resolution said, in view of the fact that certain proposed methods of providing medical care to the public through federal, state and private agencies contemplate corporate practice involving elimination or serious interference with the personal and private relations between members of the medical, dental, pharmacal and nursing professions and their clientele.

Dental Practice Acts: "Advertising" Not Synonymous with "Soliciting": The dental practice act of North Carolina authorizes the state board of dental examiners to revoke the license of any dentist "guilty . . . of false notice, advertisement, publication, or circulation of false claims, or fraudulent misleading statements of his art, skill, or knowledge, or of his methods of treatment or practice . . . or (who) has by himself or another solicited professional business." Proceedings were instituted to revoke the license of a dentist, the respondent in this case, under an accusation charging him with soliciting professional business by paid advertisements in the newspapers and by signs in colors and of large dimensions on the building in which his office was located. The board revoked his license and, from a judgment of the superior court upholding the board's action, he appealed to the Supreme Court of North Carolina. The dental practice act, said the court, inveighs against two offenses: (1) false advertising, and the circulation of false claims or fraudulent or misleading statements, and (2) soliciting professional business. There was no charge of false advertising or of the circulation of false claims or fraudulent or misleading statements. This appeal therefore raises the question only as to whether the use by a licensed dentist of paid advertisements of his work and prices in newspapers with a large circulation, and of signs in flaring colors and of large dimensions, constitutes such soliciting of professional business as is inhibited by the dental practice act. Advertising and soliciting are not synonymous terms. If they were so, every dentist who inserted a professional card in a registry, directory or other publication, and paid for such insertion, or who placed on the window or door of his office, or on the wall of the building in which his office is located, his name, followed by the word "dentist," would subject himself to

an accusation that might lead to the revocation of his license. The act makes unlawful only the use of false advertising and the circulation of truthful statements are not unlawful. The record contains no suggestion of any soliciting by the respondent otherwise than by advertising in newspapers and by signs. The court expressly refrained from passing on the ethics of the advertising resorted to by the respondent and suggested that if the North Carolina board of dental examiners desires further to limit the nature and extent of the advertising to which members of their profession may lawfully resort, their remedy lies with the legislature and not the courts. The law-making branch of the government, the court said, if in its wisdom it saw fit, might make unlawful any kind of advertising by members of the dental profession, whether false or otherwise. For the reasons stated, the judgment of the superior court, upholding the action of the board in revoking the respondent's license, was reversed.—*In re Owen (N. C.), 177 S.E. 403, J.A.M.A.,* 105:1070 (Sept. 28) 1935.

DEATHS

Ayer, C. B., Ocklawaha, Fla.; Atlanta Southern Dental College; died July 11.

Butler, John A., Wasco, Ore.; North Pacific College of Oregon, School of Dentistry, 1923; died recently.

Casey, Thomas H., Indianapolis, Ind.; Indiana University School of Dentistry, 1910; died July 26; aged 53.

Entriken, James Carroll, Philadelphia, Pa.; Thomas W. Evans Museum and Dental Institute, 1907; died August 26. Dr. Entriken was instructor and lecturer in the Evans Institute.

Gould, Earl E., Chicago, Ill.; Chicago College of Dental Surgery, 1890; died September 11.

Harned, Merton R., Rockford, Ill.; Temple University School of Dentistry, 1844; died September 18; aged 73.

Martin, J. Lewis, Philadelphia, Pa.; Thomas W. Evans Museum and Dental Institute, 1918; died August 28.

Vickers, Ernest William, Philadelphia, Pa.; Thomas W. Evans Museum and Dental Institute, 1904; died July 5.

Walker, John Lewis, Norfolk, Va.; Baltimore College of Dental Surgery, 1895; died September 6; aged 79. Dr. Walker was a member of the American Dental Association, past president of the Virginia State Dental Association and of the Virginia Tidewater Dental Association, and a member of the American Society of Orthodontists and of the Southern Society of Orthodontists. He served on the Virginia State Board of Dental Examiners and was for a number of years its secretary.

Wetterer, Albert C., Chicago, Ill.; died September 10; aged 73.

MISCELLANY

BOOK REVIEWS

Practical Orthodontia. By Martin Dewey, D.D.S., M.D., F.A.C.D. Revised by George M. Anderson, D.D.S., Professor of Orthodontia, Baltimore College of Dental Surgery, Dental School, University of Maryland; Fellow of the American College of Dentists; Certified by the American Board of Orthodontia. With the assistance of the following contributors: Bernhard Wolf Weinberger, Sidney Riesner, B. Holly Broadbent, Harry E. Kelsey, Rudolf Kronfeld, Alfred Paul Rogers, Earl W. Swinehart, Chester F. Wright, E. B. Arnold and Edward A. Kitlowski. 586 illustrations, 514 pages. Price, $8.50. Fifth revised edition. Published by the C. V. Mosby Company, St. Louis, 1935.

One of the sanest and most appealing sentences in this book is found in the preface, which says: "It is sincerely hoped that those who read the text and view the il-

lustrations will realize that the objective has been improvement and not perfection." To this point of view every capable and conscientious author must subscribe, and it seems to be the keynote of the volume. The book begins with a very comprehensive historical background of modern orthodontia consisting of nearly fifty pages, by Bernhard Wolf Weinberger, which will be found very entertaining. Naturally, of major interest are the chapters on "Occlusion" and "Malocclusion." As the basis of orthodontic practice is found in a study of the remedies for malocclusion, etiology, diagnosis and treatment are discussed; of these three, the consideration of diagnosis logically holding the most important place. Because without the science of diagnosis, no art in either medicine or dentistry can ever hope to succeed, in this book radiography is brought to the aid of the operator. The mooted question of extraction in its relation to orthodontic treatment is ably considered by Harry E. Kelsey in Chapter X, with the pros and cons carefully studied. A large section of the book is necessarily concerned with treatment in its various manifestations, discussing arch mechanism, bands, wires, coils, springs, etc., and finally the treatment of malocclusion, as a whole. An interesting chapter is that on plastic surgery, in which is included among other things clefts of the lip and palate. The book as a whole is a notable addition to the literature of orthodontia, and it should be in every dental library. The authors and publishers are to be congratulated.

A Textbook of Physiology. By William D. Zoethout, Ph.D., Professor of Physiology in the Chicago College of Dental Surgery (Loyola University). Fifth edition, 694 pages, 271 illustrations. Price, $4.00. Published by the C. V. Mosby Company, St. Louis, 1935.

This standard work has now run into the fifth edition with all of the advantages of a thorough revision. For the dental practitioner, the chapter on digestion must make its first appeal. In this chapter are considered such subjects as "Teeth and Mastication" and, in particular, caries of the teeth. In this connection, the author says: "Although it is generally conceded that the decay is a process of decalcification produced by acids formed by bacteria from the food lodged upon and between the teeth, the question of the various factors governing the formation of these acids and the extent of their action is still hotly debated." All of this is quite true, and it is also true that, up to this time, no one has been able to determine definitely just why it is that while the bacteria that are supposed to bring about decay may be demonstrated in every mouth, certain mouths are practically immune and others are exceedingly susceptible to dental decay. There is a missing link somewhere in the manifestations of caries that still baffles solution. The entire chapter on digestion is worthy of careful study. So much has been said in recent years on vitamins and their significance in the animal economy that this subject naturally comes in for pointed consideration, and while the author modestly intimates that he is giving only "a meager outline," the fact remains that he presents a very clear picture of the various vitamins and their manifestations. The volume as a whole is carefully planned and well written. Both author and publishers have collaborated to make the book a valuable addition to the literature of medicine and dentistry.

A Textbook of General Bacteriology. By Edwin O. Jordan, Ph.D., Professor of Bacteriology in the University of Chicago and in Rush Medical College, Chicago. Eleventh edition, entirely reset. 825 pages, 202 illustrations. Cloth, $6.00. Philadelphia and London: W. B. Saunders Company, 1935.

Jordan's comprehensive bacteriology has long been considered standard in its class, and the eleventh edition has brought the work quite up to date. For the dental student and practitioner, one of the chapters that should receive special consideration is that on "Immunity and Body Resistance to Disease." Aside from the general interest in this subject, the question of immunity and susceptibility in the manifestations of

dental caries should always hold for the dentist unusual concern, for the reason that it enters so largely into the practical management of caries in the mouths of patients. Indeed the present work might well have gone more fully into the bacteriology of dental decay, though the fact must be recognized, as the author has indicated, that while "an enormous amount of work has been done on this subject," there remains much confusion as to the particular *modus operandi* of the carious process. The question of dental caries cannot be solved by a study of bacteria alone, though of course it must be manifest that little can be accomplished in this direction without gaining a knowledge of bacteria, and therefore the more we know of the subject, the better equipped we shall be to eventually solve our problem. As a particularly interesting chapter of general information, and without reference to dental problems, the one on "Bacteria in the Industries" will be found very entertaining. No one can read this chapter without being impressed with the rôle that bacteria play in the industries, and thus with their influence on our lives in general.

Laboratory Methods of the United States Army. Edited by James Stevens Simmons, B.S., M.D., Ph.D., Major, Medical Corps, United States Army; Director of Laboratories, Army Medical Center; Director of the Department of Preventive Medicine, Army Medical School. Associate Editor, Cleon J. Gentzkow, M.D., Ph.D., Major, Medical Corps, United States Army; Chief of the Division of Chemistry, Army Medical School. Approved by the Surgeon-General of the United States Army. Fourth edition, greatly enlarged and thoroughly revised, published 1935. 1110 pages, illustrated with seventy engravings. Limp binding, $6.50 net. Published by Lea & Febiger, Philadelphia.

The fourth edition of this very exhaustive work has been thoroughly revised and certain of its sections have been practically rewritten. This brings the book quite up to date. The laboratory technic is given in many of the affections of mankind, particularly in the contagious diseases and in those most likely to affect an army. All of this is very necessary when we consider the havoc that is sometimes wrought in our army by uncontrolled disease. The dental representative in the work is Captain Clarence P. Canby, D.D.S., chief of the Dental Laboratory Division, Army Medical School, Washington, D. C. Under the chapter "Methods of Examination," there is discussed the "Collection of Specimens," and, in this connection, there is naturally a consideration of "Material from the Teeth and Gums." The collection of this material is outlined in some detail, and not without reason, in recognition of the fact that the difficulty of collecting pure strains of bacteriologic products from the mouth is well nigh insurmountable. The value of the laboratory methods outlined in this book in the study of the various diseases under consideration must at once be apparent to the reader, and accordingly the authors are to be congratulated on the production of a notable addition to the scientific literature of dentistry.

Book Received

Minor Oral Surgery for the General Dental Practitioner. By Alonzo Milton Nodine, M.R.C.S., L.R.C.P., L.D.S., R.C.S., D.D.S., 142 pages, 46 illustrations. Price, 15 shillings net. Published by J. S. Cottrell and Company, 15-17 Charlotte St., London, England.

ANNOUNCEMENTS*

CALENDAR OF MEETINGS

American Dental Association, New Orleans, La., November 4-8.

American Academy of Periodontology, New Orleans, October 31-November 2.

American Academy of Restorative Dentistry, New Orleans, November 2-3.

American Society of Oral Surgeons and Exodontists, New Orleans, November 1-2.

Association of American Women Dentists, New Orleans, November 4.

Chicago Dental Society Midwinter Clinic, February 17-20.

Dental Protective Association of the United States, Chicago, Ill., December 16.

Greater New York December Meeting, New York City, December 2-6.

International Dental Congress, Vienna, August 2-9.

Midseason Clinic of the Connecticut State Dental Association, New Haven, November 14.

National Board of Dental Examiners, New Orleans, November 2-3.

North Atlantic Orthodontic Society, Brooklyn, N. Y., November 26.

Southern Society of Orthodontists, Chattanooga, Tenn., January 27-29.

Southwestern Society of Orthodontists, Houston, Texas, October 31-November 2.

Marquette University Dental Alumni Association, Milwaukee, Wis., November 20-23.

American Dental Assistants Association, New Orleans, November 4-8.

American Dental Hygienists' Association, New Orleans, November 4-8.

Society for the Advancement of General Anesthesia in Dentistry, New York City, third Monday in February, April, October and December.

District of Columbia at George Washington University, Washington, D. C., second and fourth Tuesdays in each month from October to June, inclusive.

STATE SOCIETIES

December

Ohio, at Columbus (2-4)

February

Minnesota, at St. Paul (25-27)

April

Connecticut, at Stamford (15-17)
Kansas, at Salina (27-29)
Massachusetts, at Boston (28-May 1)
Montana, at Butte (16-18)

May

Illinois, at Peoria (12-14)
Indiana, at Indianapolis (18-20)
New York, at New York City (12-15)
Tennessee, at Memphis (11-13)
West Virginia, at Fairmont (18-20)

STATE BOARDS OF DENTAL EXAMINERS

California, at San Francisco, December 9. Kenneth I. Nesbitt, 450 McAllister St., San Francisco, Secretary.

Connecticut, at Hartford, November 19-23. Almond J. Cutting, Southington, Recorder.

Colorado, June 23-27. David J. Tepley, 807 Republic Bldg., Denver, Secretary.

Indiana, at Indianapolis, November 18-21. J. M. Hale, Mt. Vernon, Secretary.

Iowa, at Iowa City, December 16-20. Hardy F. Pool, Mason City, Secretary.

Minnesota, at Minneapolis, December 13-19. Paul Hagen, Crookston, Secretary.

New Jersey, December 2-7. John C. Forsyth, 140 W. State St., Trenton, Secretary.

Pennsylvania, at Philadelphia and Pittsburgh, December 3-7. W. A. McCready, Highland Bldg., Pittsburgh, Secretary.

Rhode Island, at Providence, December 3-5. Robert D. Wholey, State Office Bldg., Providence, Chief.

*Announcements must be received by the fifth day of the month in order to be published in the forthcoming issue of THE JOURNAL.

Texas, at Houston, December 9-13. R. T. Weber, 1014 Norwood Bldg., Austin, Secretary.

Wisconsin, at Milwaukee, December 9-13. S. F. Donovan, Tomah, Secretary.

ARIZONA STATE BOARD OF DENTAL EXAMINERS

The Arizona 1935 Dental Code requires all registrants in Arizona to pay an annual registration fee of $5 on or before January 1.

R. A. McCall, *Secretary,*
719 Professional Bldg.,
Phoenix.

STATE OF MINNESOTA BOARD OF DENTAL EXAMINERS

The next examination of the Minnesota State Board of Dental Examiners will be held at the University of Minnesota, College of Dentistry, Minneapolis, December 13-19. All applications must be in the hands of the secretary at least ten days prior to date of examination. For further particulars, address

Paul Hagen, *Secretary,*
Crookston.

PENNSYLVANIA STATE BOARD OF DENTAL EXAMINERS

The Pennsylvania State Board of Dental Examiners will hold its next examinations December 3-7 at Philadelphia and Pittsburgh.

W. A. McCready, *Secretary,*
1115 Highland Bldg.,
Pittsburgh.

STATE OF RHODE ISLAND DIVISION OF EXAMINERS REGISTRATION IN DENTISTRY

The Board of Examiners in Dentistry will meet to examine candidates for license to practice dentistry and dental hygiene in the State House, Providence, December 3-5, beginning each day at 9 a.m. Candidates shall present to the chief of the division of examiners, at least ten days prior to the examination, an application, with fee and photograph. For applications and further information, address

Robert D. Wholey, *Chief,*
State Office Bldg.,
Providence.

TENNESSEE STATE DENTAL ASSOCIATION

The Tennessee State Dental Association will hold its next meeting in Memphis, May 11-13, at the Hotel Peabody.

E. E. Justis, *Secretary,*
708 Exchange Bldg.,
Memphis.

MINNESOTA STATE DENTAL ASSOCIATION

The Fifty-Third Annual Meeting of the Minnesota State Dental Association will be held in the Municipal Auditorium, St. Paul, February 25-27.

L. M. Cruttenden, *Secretary,*
1353 Lowry Bldg.,
St. Paul.

DENTAL SOCIETY OF THE STATE OF NEW YORK

The Sixty-Eighth Annual Meeting of the Dental Society of the State of New York will be held May 12-15, at the Waldorf-Astoria Hotel, New York City. Further information can be obtained by writing to

Charles M. McNeely,
1 Nevins St.,
Brooklyn.

DENTAL PROTECTIVE ASSOCIATION OF THE UNITED STATES

The Annual Meeting of the Dental Protective Association of the United States will be held at the Palmer House, State and Monroe Sts., Chicago, December 16, at 4 p.m.

E. W. Eliot, *Secretary,*
55 E. Washington St.,
Chicago, Ill.

NORTH ATLANTIC ORTHODONTIC SOCIETY

The next meeting of the North Atlantic Orthodontic Society will be held November 26, at 8 p.m., in the Knights of Columbus Bldg., Brooklyn, N. Y.

Talbot H. LeBlanc, *Secretary,*
515 Ocean Ave.,
Brooklyn, N. Y.

GREATER NEW YORK DECEMBER MEETING

The Greater New York Meeting will

be held December 2-6. For copy of the official program, address Hotel Pennsylvania, Room 106A, New York City.

GEORGE C. DOUGLASS, *Chairman,*
Press and Publication Committee.

THE MOUNT SINAI HOSPITAL (NEW YORK CITY) FIFTH LECTURE COURSE ON DENTAL MEDICINE

The 1935-1936 lecture course is as follows: Joseph Schroff, October 10: Review of Oral Surgical Lesions and Operative Procedure and Treatment; Asher Winkelstein, November 14: Dental Infection and Its Relation to Gastro-Intestinal Disease; Isadore Rosen, December 12: Oral Lesions from Viewpoint of Dermatologist; Paul Klemperer, January 9: Histopathologic Studies of Dental Tissues; John Garlock, February 13: Treatment of Unusual Oral Lesions from Viewpoint of General Surgeon; Herman Lande, March 12: Diabetes and Its Relation to Diseases of Oral Cavity; Herbert Pollack, April 9: Oral Manifestations of Vitamin Deficiency and Dental Aspect of Abnormal Metabolism. All lectures will start promptly at 8:30 p.m., in the Laboratory Annex Lecture Room. There will be a presentation of clinical cases before each lecture. All physicians and dentists are invited to attend.

HARRY A. GOLDBERG.

F. D. I.

Procedure of the Congress: Reports: The Organization Committee of the Congress decides, according to the propositions of the Scientific Commission of the F. D. I., on the extent of the ground to be covered by each of the subjects and speakers. The speakers are invited to work out a report on the subject chosen and send it, before Jan. 31, 1936, to the Committee of Organization, Vienna IX, Währingerstrasse 25 a. The reports are concerned with the results of scientific research during the last five years. If possible, several reporters and official debaters of various countries will be invited for each subject. The reports and their translations will be published, and will be sent before the beginning of the Congress to all active members who have applied before April 1, 1936. Attention must, therefore, be paid to the date fixed for the handing-in of the text. Reports sent in after that date cannot be considered. Manuscripts of reports must be typewritten and must not exceed thirty pages. Any manuscripts written by hand will be sent back to the authors. Each morning will be devoted to the summaries of reports (twenty minutes); slides and translations of the summary in the other languages of the Congress (twenty minutes); official debaters (fifteen minutes each). Finally, forty minutes will be allowed for open discussion of the subject then in question. If possible, debaters must ask permission to speak after the official discussion (not more than five minutes). The reporter will be allowed ten minutes at the end. All slides to be shown must have legends in three languages printed on them.

Communications and Demonstrations: Every member of the Congress who wishes to read a paper, or give a demonstration, must send the title of same before June 1, 1936, to the National Committee, together with a summary and figures (limited number), stating at the same time what installation and equipment he will require. His summary must not exceed two pages of typescript. The afternoons will be devoted to demonstrations and original communications referring to the subjects of the day in question. It will be possible for most of the subjects, including the theoretical ones, to be dealt with in the form of demonstrations (table clinics), and this method is strongly recommended. Each demonstration will take place at a separate table, so that it may last the whole afternoon. Arrangements will be made for interpreters to be present in order that visitors may have no difficulty in understanding the various demonstrations. Any member who would prefer to treat his subject in a communication must mention this when announcing the communication. A special room will then be put at his disposal, fifteen minutes only being allowed for his communication.

AMERICAN DENTAL ASSOCIATION

New Orleans, La. November 4-8, 1935.

HOTEL RESERVATION

In securing hotel reservations for the 1935 Session, consult the hotel rate-sheet and fill out the blank application below. Mail immediately to the hotel you wish to patronize. The hotel will then advise you of the reservation which has been made for you.

In case your first choice cannot be made, kindly indicate second and third choices. If none of your choices are available, the hotel manager will mail your application to the Chairman of Halls & Hotels Committee, who will make as favorable reservation for you as possible.

Please remember that a reservation constitutes a contract with the hotel to provide you with the accommodations you desire. If you find it impossible to carry out your part of the contract, namely, to occupy the room at the time agreed on, please write or wire the hotel, releasing the room reserved for you in order that it may be available to others attending the meeting.

MAIL THIS APPLICATION DIRECT TO THE HOTEL

HOTEL RESERVATION

AMERICAN DENTAL ASSOCIATION, NEW ORLEANS, LA., NOVEMBER 4-8, 1935.

.....Hotel.

New Orleans, La.

Please reserve sleeping accommodations as noted below:

.....Room (s) With bath for.....people. Rate desired per day $.....

.....Room (s) Without bath for.....people. Rate desired per day $.....

Second choice hotel..... Third choice hotel.....

ROOMS TO BE OCCUPIED BY: ADDRESS IN FULL

Applicant..... .....

....

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....

Please confirm this reservation to applicant. I further agree to notify the hotel at once in the event I am unable to use this reservation.

IMPORTANT TO HOTEL MANAGER: In the event you cannot accept this reservation, please forward this application at once to Dr. G. O. Rosado, Chairman Halls & Hotels Committee, 827 Maison Blanche, New Orleans, La., who will attend to the assignment of this reservation.

HOTEL	WITH BATH		
	One Person	Two Persons	Twin Beds
BIENVILLE HOTEL Lee Circle	$2.00–2.50 3.00–3.50	$3.50–4.00 5.00	$5.00–6.00 7.00
DE SOTO HOTEL 420 Baronne Street	2.00–2.50 3.00–3.50 4.00	3.50–4.00 4.50–5.00	5.00–6.00 7.00
JUNG HOTEL 1500 Canal Street	2.50–3.00 3.50–4.00	5.00–6.00	6.00–7.00 8.00
LA SALLE HOTEL 113 Canal Street	2.00–2.50 3.00	3.50–4.00 5.00	5.00–6.00
HOTEL MONTELEONE 214 Royal Street	2.50–3.00 3.50–4.00	5.00–6.00	6.00–7.00 8.00
HOTEL NEW ORLEANS 1300 Canal Street	2.00–2.50 3.00–3.50	3.50–4.00 5.00	5.00–6.00
PONTCHARTRAIN APT. HOTEL 2031 St. Charles Avenue		5.00–6.00	
ROOSEVELT HOTEL 123 Baronne Street	3.00–3.50 4.00–4.50 5.00–6.00	5.00–6.00 7.00	7.00–8.00 9.00
ST. CHARLES HOTEL 211 St. Charles Street	2.50–3.00 3.50–4.00 4.50–5.00	4.50–5.00 6.00–6.50	6.00–7.00 8.00

PACKAGE LIBRARIES*

Compiled by and Available for Circulation

from the

LIBRARY BUREAU

of the

AMERICAN DENTAL ASSOCIATION

212 East Superior Street, Chicago, Ill.

†Abnormal secretion of saliva.
Absorption of roots and bone.
†Actinomycosis of head and neck.
Agranulocytic angina.
Alveolar process—its structure and resorption.
Alveolectomy.
Amalgam fillings and physical properties of amalgam.
Anesthesia—discovery and early uses.
†Anesthetics in children's dentistry.
Angle's orthodontic appliances.
Apicoectomy.
Articulation, occlusion and mandibular movements.
Avertin in oral surgery.
Bacteria of the mouth.
Bacteriological studies of root canals.
Best time for orthodontic treatment.
Biographies of dentists.
Blood examination in focal infection.
Bogue's articles from Dental Digest.
†Bridges using inlays as abutments.
Broken needles.
Bureau of Standards reports.
Business side of dentistry.
Calcium metabolism.
Cancer of mouth.
†Carbon dioxide administered in conjunction with nitrous oxid-oxygen anesthesia.
†Cast gold crowns.
Cast gold inlays.
Casting gold, including inlays and dentures.
Cavity preparation.
†Cementation of inlays.
Cements—uses and physical properties.
Centric occlusion.
†Child psychology.
Children's dentistry.
Clasps—wire and cast.
Cleft lip and palate—etiology and surgical treatment.
†Cleft palate—orthodontic treatment and prosthetic appliances.
Community and school dental service.

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*Each package library contains information on one of the subjects listed and is composed of reprints, magazine clippings, etc., on that subject only. The packages are loaned to members of the Association for a period of one week after date of receipt. Unless the material is reserved for another borrower, an extension of time will be granted on request.

The rental fee for borrowing a package library is 50 cents. This fee must accompany the request for a package library. No packages are sold.

†This package contains less than the usual number of articles.

Comparative dental anatomy.
Conduction anesthesia.
Condyle path movements.
†Congenitally missing teeth.
Contributions dentists have made outside their profession.
†Curetting.
Cysts and tumors of mouth.
Dental assistants.
Dental care of the preschool child.
Dental caries.
Dental clinics.
†Dental disease and practice in the tropics.
Dental economics.
Dental education.
Dental embryology.
Dental ethics.
Dental health education.
Dental hygienists.
Dental libraries.
Dental metallurgy.
†Dental nomenclature.
Dental service in the World War.
Dental technicians.
Dentifrices.
Dentistry as a career and the status of the dentist.
†Dentistry in foreign lands.
Dentistry of the time of George Washington.
Denture bases—discussion of materials.
Denture casting.
Diabetes and dentistry.
Diathermy in dentistry.
Diet and nutrition in relation to teeth.
Diet in pregnancy.
Diet in relation to periodontal disease.
Diseases of the tongue.
Dry socket.
Education of denture patients.
Electrogalvanic lesions.
†Emphysema.
Endocrine glands in relation to teeth.
†Epithelial débris.
Erosion and abrasion of the teeth.
†Eruption of teeth—dates of eruption and accompanying symptoms.
†Eruption of teeth—theories regarding.
Esthetics in denture construction.
Ethyl chlorid.
Ethylene anesthesia.
Etiology of caries.
Etiology of malocclusion and preventive orthodontia.
Evipal in oral surgery.
Evolution of human dentition.
Examination of the mouth and oral diagnosis.
Extraction of teeth.
†Facebow technic and recording of occlusion.
Facial prosthesis.
Fauchard's (Pierre) life.
Fixed and removable bridgework.
Fixed bridgework.

Focal infection.
†Focal infection and arthritis.
†Focal infection and oral sepsis in relation to gastro-intestinal disturbances.
Focal infection in relation to diseases of the eye.
Foreign bodies (of dental origin) in the lungs and esophagus.
Fractures of the jaws.
Full denture construction.
†Gagging.
Gold foil.
Growth and development of teeth and jaws.
Habits as factors in malocclusion.
†Halitosis.
Hemophilia or excessive hemorrhage following extraction.
Hereditary influences in malocclusion.
†Histologic examinations of fractured roots.
Histologic study of teeth and tissues.
Histology of peridental membrane.
History and progress of dentistry.
History of dental ceramics.
History of dental education in U. S.
History of dentistry.
†History of full denture construction.
Hospital dental service.
†Hypercementosis and excementosis.
†Hypnotism.
Identification by means of teeth.
Immediate denture service.
Impacted teeth and their removal.
Impacted third molars.
Impacted teeth and their relation to various physical disturbances.
Impacted upper cuspids.
Implantation, replantation, transplantation of teeth.
Impression materials and technic.
†Impression taking for cast gold inlays.
Impression technic.
Incidence of dental defects.
Indirect inlay technic.
Industrial dental service.
Influence of deciduous teeth and first permanent molars on occlusion.
†Influence of dental improvements on appearance and mental conditions.
Influence of diet on saliva.
Interpretation of roentgenograms.
Investment compounds and technic.
Ionic medication.
†Jackson's (V. H.) articles on orthodontic appliances.
†Labial frenum.
Lectures to nurses.
Lesions of the mouth.
†Leukemia.
†Leukoplakia.
Local anesthesia.
Local anesthesia—contraindications and untoward results.
Lower denture construction.
†Ludwig's angina.
Malpractice in dentistry.
Masks and casts.
Materia medica and pharmacology.
†Matrix.

Maxillary sinus and antrum—diseases and treatment.
Methods of sectioning and staining teeth.
Monson's theory.
Mottled enamel.
Mouth hygiene.
Muscle exercises and training in orthodontia.
Nitrous oxid-oxygen analgesia.
Nitrous oxid-oxygen anesthesia.
Occlusion in partial dentures.
†Occlusion in relation to operative dentistry.
Opening the bite.
Oral diagnosis with reference to roentgen ray.
Oral manifestations of metallic and drug poisoning.
Oral manifestations of systemic conditions.
Organized dentistry.
Orthodontia and its relation to dentistry and medicine.
Orthodontia for the general practitioner.
†Orthodontic anchor bands.
Orthodontic appliances.
Orthodontic diagnosis and measurements.
†Orthodontic treatment of impacted cuspids.
Osteomyelitis of the jaws.
"Panel" or insurance dentistry.
Partial dentures.
†Permeability of tooth structures.
Phonetics and speech defects.
Photography in dentistry.
Physical therapy in dentistry.
†Pinledge and pinlay attachments.
Place of extraction in orthodontic treatment.
Plastic surgery.
Pollia's articles on radiology.
Porcelain in dentistry.
Porcelain inlays.
Porcelain jacket crowns.
Postoperative complications and care.
†Postoperative psychosis.
Pregnancy and dental disease.
Preoperative examination of patients.
Preparation of cavities with hypersensitive dentin.
Preventive dentistry.
Preventive orthodontia.
Procain (novocain) dermatitis.
†Program building for state and district societies.
Prophylactic odontotomy.
Pulp amputation and mummification.
Pulp conservation including pulp capping and cavity lining.
†Pulp pathology.
†Pulp stones.
Pyorrhea.
Pyorrhea—early recognition and treatment.
Pyorrhea—etiology and relation to systemic conditions.
Pyorrhea—surgical treatment of.
Relation between dental conditions and the mental health of insane.
Relation of the dentist to the physician.
Removable bridgework.
†Removable bridgework—discussing various types of attachments.
Research Commission reports.

Restoration of oral functions including opening the bite.
Retainers used in orthodontia.
Rentention of deciduous teeth and delayed eruption of permanent teeth.
†Retrusion of the mandible causing impaired hearing.
†Roofless dentures.
Root canal treatment.
†Salivary calculus.
†Salivary glands.
†Shock, syncope and collapse.
Should dentistry be advertised?
Silicate cements (see cements—uses and physical properties).
†Silver nitrate.
†Smith's articles on oral prophylaxis.
Social and economic phases of dentistry and other health services.
†Space retention—its importance and methods of accomplishing.
Staining porcelain teeth.
Stainless steel for orthodontic appliances.
Status of dentistry in our social and economic system.
Sterilization of dental instruments.
Stomatologic program (A.S.S.)
Stomatology—general discussions of.
Stories and rhymes for children.
Studies of enamel including permeability, staining, etc.
Suggestions for talks to mothers.
Suggestions for talks to students.
†Supernumerary teeth.
Syphilis in relation to dentistry.
Temporomandibular joint.
Three-quarter crowns.
Tooth forms and arrangement for full dentures.
Toothbrushes and toothbrushing technic.
Toothbrushes, tooth pastes and mouth washes.
†Torus palatinus.
Transplantation of teeth (see implantation of teeth).
Traumatic occlusion.
Trigeminal neuralgia.
Trismus and ankylosis.
Tuberculosis and dentistry.
Ultraviolet ray in the treatment of pyorrhea.
Ultraviolet ray therapy in dentistry.
Undergraduate and graduate orthodontic education.
Use of elevators in extraction.
Value of dental service in schools.
Value of roentgen-ray examinations in orthodontia.
Various studies of or pertaining to saliva.
Vincent's infection.
Vulcanite and vulcanite stomatitis.
Waxes and wax expansion method.
†Willett's articles.

The Dental Creed

Copies of the creed are available in form suitable for framing from the Library Bureau of the American Dental Association, 212 E. Superior St., Chicago, at 50 cents. They are 10 by 15 inches and are printed on high grade paper in brown ink. The initial letter may be obtained in red or green, as preferred. Each copy is signed by the author. This creed appeared as an editorial in the August, 1934, issue of The Journal. Kindly send remittance with order.

Written Instructions for Your Denture Patients

A fourth printing of "Your New Teeth," a booklet for denture patients, has just come off the press. This booklet is intended primarily for the patient who is wearing dentures for the first time. It enumerates some of the difficulties that may be encountered when one first wears dentures and offers suggestions as to how these difficulties may be overcome. There is also much of interest to the patient who has been wearing dentures, as information is given regarding the care, repair and rebasing of dentures. The information in this booklet was taken from the article entitled "Instructions for the Edentulous Patient," by B. L. Hooper, which was published in The Journal, February, 1932. The price of these booklets is: 25, $1.00; 50, $1.50; 100, $2.00. Kindly send remittances with order. A sample of booklet will be sent on request.

Orthodontia Editorial

A few more copies of the tribute to orthodontia, which originally appeared as an editorial, may be obtained. This editorial is reprinted in form suitable for framing, on good quality paper, measuring 10 by 15 inches. This print is brown with the initial in green or red, as preferred. The editorial is signed in brown by the author. The cost per copy is 50 cents. Send your order and remittance to the Library Bureau.

Dental Service in Hospitals

This neglected phase of hospital care is interestingly presented in an article by L. Roy Johnston which appeared in the magazine *Modern Hospital* for July, 1934. A reprint of this article may be obtained from the Library Bureau on request by sending 1½ cents postage.

Operative Radiodontia for the Child Patient

This reprint by W. S. Thompson from The Journal for December, 1934, has much information for the specialist in children's dentistry and for those interested in the use of the roentgen rays. Explicit instructions are given for making a complete roentgenographic survey of the child's mouth. This reprint may also be obtained by sending 1½ cents postage.

Professional Attitudes and Social Trends

This article by H. E. Phillips appeared in the *Illinois Dental Journal* for March, 1935, and includes a discussion by H. W. Oppice. Another article by Dr. Phillips entitled, "The Profession and Third Party Practice," from *The Dental Digest* for January, 1935, may likewise be obtained. The postage for both of these reprints is 3 cents.

Dental Practice and Income

Abstracts of the book by this title by Leven and Beck, which was published by the University of Chicago Press in 1932, may be obtained by sending in 1½ cents postage. This printed abstract contains fourteen pages including tables and graphs. The price of the bound volume of the book is $2. This may also be purchased from the Library Bureau.

Status of Dentistry in Our Economic System

This reprint of Michael M. Davis' article which appeared in The Journal for May, 1930, discusses such topics as family expenditures for dental care, family income and pay clinics. Postage, 1½ cents.

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1934-1935

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